THE WIRRAL ARCHAEOLOGY "SEARCH FOR THE BATTLE OF BRUNANBURH" PROJECT

AN INITIAL ASSESSMENT OF THE PROJECT TO DATE
ON BEHALF OF WIRRAL BOROUGH COUNCIL

BY PHC SERVICES
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Cover image: Andy Quick

TABLE OF CONTENTS

Acknowledgements **page 5**

SECTION A: OVERVIEW – Paul Sherman **page 6**

Introduction **page 6**

WBC remit **page 6**

Background **page 6**

KEY TASK A – WORKS UNDERTAKEN SO FAR BY WA – Paul Sherman **page 7**

The WA project **page 7**

The WA questionnaire **page 8**

Notes and Observations **page 9**

Discussion– methodologies employed for recovery and assessment **page 10**

CONDITION AND STORAGE OF FINDS - Paul Sherman **page 12**

Examples of condition grades 1 to 5 **page 13**

Results of condition grading **page 15**

Limitations imposed on the assessment of the find sites **page 18**

THE METALWORKING FINDS ASSEMBLAGE - Paul Sherman **page 19**

Metalworking Tools **page 19**

Iron billets/bar **page 31**

Iron plate/sheet **page 31**

Metal working residues **page 32**

Discussion on metalworking **page 35**

Discussion on the metalwork of potential battlefield related material **page 38**

DISCUSSION ON THE POSSIBILITY OF THE MAIN FIND SITE BEING PART OF A BATTLE-FIELD SCENARIO - Paul Sherman **page 49**

SECTION B – THE FINDS ASSEMBLAGE – Robert Philpott page 53

The Wirral Archaeology claim **page 53**

The current assessment **page 53**

Definition of Battlefield Archaeology **page 54**

THE MATERIAL AND ACCOMPANYING WA DOCUMENTATION – Rob Philpott **page 55**

The existing documentation **page 55**

Numbering systems **page 55**

Databases/Listing **page 55**

Finds identification **page 55**

Lack of Findspot information **page 55**

GENERAL CHARACTER OF THE FINDS ASSEMBLAGE – Rob Philpott **page 56**
Summary of Finds **page 56**
Romano-British finds (AD 43-410) **page 56**
Early medieval finds (410-1066) **page 58**
Inscribed Lead Objects **page 59**
Gaming pieces/weights **page 60**
Probable Early Medieval Finds **page 63**
Early Medieval Discussion **page 65**

Finds of uncertain but possibly medieval date **page 65**
The ironwork: bars, strips etc **page 65**
Bloomery iron **page 68**
Complete tools and other objects **page 69**
Weapons: swords, arrowheads, spearheads **page 75**
Possible blanks or tools **page 79**

Later medieval finds (1066-1540) **page 81**
Vessels **page 81**
Roof Tile **page 82**
Objects of uncertain date and function **page 82**
Metal-working **page 85**

Post-medieval finds (1540-1900) **page 87**
Horse-harness mounts **page 87**
Personal items **page 88**
Decorative mounts/finial **page 89**
Zoomorphic figure **page 89**
Building materials **page 89**
Toys **page 89**
Other items **page 90**

Modern finds (Late 19th-20th century) **page 90**
Possible agricultural equipment **page 90**
Undiagnostic finds **page 91**
Examples of incorrectly identified items **page 93**
Bone report – Poppy Price **page 96**

The WA approach – Rob Philpott **page 98**
Conclusions **page 98**
References **page 98**

SECTION C – REVIEW OF DOCUMENTARY EVIDENCE – Clare Downham **page 101**
The historical background to the Battle of Brunanburh **page 101**
The development of the Brunanburh narrative **page 102**
The name of the battle site **page 105**

Minor names and folklore **page 111**
Why the Wirral? **page 113**
How big was the Battle of Brunanburh? **page 119**
The battle site **page 123**
Conclusion **page 123**
Bibliography **page 124**

SECTION D – GEOPHYSICAL SURVEYS – Paul Sherman **page 127**
Geophysical Survey 1: [locational data removed] **page 127**
Geophysical Survey 2: [locational data removed] **page 131**

SECTION E – THE PHYSICAL REMAINS OF THE VIKING AGE IN THE WIRRAL – Clare Downham **page 134**
SECTION F – COMPARATIVE SITES – Clare Downham **page 137**
SECTION G - THE EARLY MEDIEVAL BATTLE CLAIM – Rob Philpott **page 138**
The wider material cultural context **page 138**
Does the assemblage represent the Battle of Brunanburh? **page 140**
The Battlefield itself **page 140**
Viking camps **page 141**
Potential Signature for Brunanburh camps **page 141**
Camp location **page 142**
An early medieval battle assemblage? **page 142**
Locating the battle **page 143**
Finds distribution **page 144**
SECTION H – **RECOMMENDATIONS FOR THE FUTURE -** Paul Sherman, Rob Philpott & Clare Downham **page 146**
SECTION I – THE STANDARDS FOR LISTING A REGISTERED BATTLEFIELD – Clare Downham **page 148**
APPENDIX 1 - Documentation issues – Rob Philpott **page 150**
APPENDIX 2 - NRM Lab report for soil sample **page 151**
APPENDIX 3 – Coin Finds **page 155**

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SECTION A - OVERVIEW – Paul Sherman

Introduction

Various talks with displays of artefacts have been made at public meetings regarding a large number of finds recovered by a group of metal detectorists on the Wirral. The group that have recovered the finds, Wirral Archaeology, (WA) have called the project "The search for the Battle of Brunanburh". Some of the material displayed has been collected over many years. However, in the past few years, significant numbers of finds, some reputedly battle related, have been recovered by the group's members.
The three contributors to this report have all, at various times, been invited to presentations, public talks and displays of metal detected material made by WA. It was at one such meeting that this writer was first invited to view a selection of objects by the group and identified several finds associated with metal working. Whilst all three contributors have over a period of time provided advice and assistance to the project when requested by WA, the work carried out on the present report is entirely independent of WA and being conducted on behalf of Wirral Borough Council. There is no conflict of interest between the council instruction to the contributors working on this assessment and any current or previous engagement between the contributors and WA as a group or its individual members.

The Battle of Brunanburh took place in 937 between the Saxon king Athelstan and an alliance made up of Olaf Guthfrithsson, the Viking king of Dublin and Constantine II, king of Scotland. Owain, king of Strathclyde was also party to the alliance. Contemporary accounts state that whilst both sides suffered heavy losses, the outcome was a decisive victory for Athelstan. Constantine survived Brunanburh although one of his sons was killed in the battle. The Battle of Brunanburh is sometimes stated by historians to be the most important battle on British soil prior to 1066 as it preserved the unity of England.

Wirral Borough Council has commissioned PHC Services to compile a report which broadly comprises an assessment of the research carried out by WA, an initial assessment of the recovered finds and a review of documentary sources relating to the battle. One of the reasons the report is being carried out is in order to establish, as far as is reasonably practicable the heritage significance of the sites and whether there is sufficient evidence to suggest that some of the recovered finds may indicate that a tenth century battle took place in the area. The assessment of finds and the review of documentary evidence relating to the battle also examines the probability of the find site(s) being the likely location of the Battle of Brunanburh.

WBC REMIT
Background

Wirral Council understands that after several years of investigation, the metal detecting group Wirral Archaeology (WA) has recently been associated with public announcements that they have collected evidence and significant archaeological finds in areas of central Wirral, which may relate to the Battle of Brunanburh. Given the potential historic and heritage significance of these claims, the Council wishes to commission an independent report to review the status of the work undertaken to date, the importance of the finds and the next steps which the Council should take working with WA, to help safeguard the historical assets.

The report will review the work undertaken by Wirral Archaeology to date, provide recommendations on the way forward for their research in order to provide acceptable and continuing data for consideration in the

Local Plan, and assess the documentary evidence required by the Merseyside Environmental Advisory Service (MEAS), including the formal recording of finds and their provenance for submission to the Historic Environment Record (HER).

Key Tasks.
In liaison with Merseyside Environmental Advisory Service, Historic England, and if appropriate The Battlefields Trust, Wirral Council wishes the independent consultants to:
A – Provide an independent overview of the works undertaken so far by Wirral Archaeology, including field-work, recording and storage of archaeological finds, and how details of the finds are being assessed;
B – Provide an initial assessment of the finds, the methods of documentation and recording, their condition and significance; undertake preliminary scientific analysis of a sample of finds to determine their composition or date
C – Provide a review of the historic research undertaken so far, including documentation, topographical surveys, place-name studies, and battlefield landscape assessment/s;
D – Undertake a limited programme of geophysical surveys to assist in establishing the character, form and extent of any archaeological remains as part of an ongoing investigation to determine their, depth, complexity and state of preservation, thus allowing an assessment of their significance within the known history of the area.
E – Assess what other previous local archaeological research or relevant finds have been recorded (i.e. objects that may be suggestive of a local ancient conflict site, etc) in central Wirral.
F – Examine the scope for comparing the finds recovered by Wirral Archaeology to those of other potentially related sites previously or currently being investigated in the northwest region; and/or from another comparable battle site identified from the same period;
G – Provide an assessment on whether the works undertaken so far indicate that a major tenth century battle, potentially Brunanburh, took place in central Wirral;
H – Provide advice and an indication of the costs which might be incurred for a programme of cleaning, stabilisation, conservation and identification and future storage of the finds
I – Provide advice on the standard of proof required by The Battlefields Trust to satisfy their criteria for the statutory declaration of a Registered Battlefield; and what additional measures or information from Wirral Archaeology would be required to meet these requirements. (Note by PS: It is Historic England not The Battlefields Trust that designate registered battlefields.)

KEY TASK A – THE WORKS UNDERTAKEN SO FAR BY WIRRAL ARCHAEOLOGY – Paul Sherman

The Wirral Archaeology 'Search for the Battle of Brunanburh' project

For the first part of this section, this writer will comment on works recorded as being undertaken by WA from their own material, including their website as well as local talks and observations made on various site visits. This writer was also involved in carrying out two geophysical surveys for WA, both on land forming part of [locational data removed]. Later in this section, I will comment very briefly on the storage of the various finds. The more detailed assessment and comments on storage, condition and recording of finds will be covered in Key Task – B by myself and Robert Philpott.

In order to provide an assessment containing an overview of the works undertaken so far by WA, this writer firstly visited the group's website to find out more about their activities and research and secondly with Clare Downham compiled a brief questionnaire that was emailed to each individual member of WA to

ascertain the scope and extent of the research carried out by individual members as part of the group's activities. All members were asked by the WA committee to cooperate fully with requests for information from both myself and Clare Downham in carrying out the assessment on behalf of WBC.

The WA website states that the group first made a public display of finds related to Brunanburh in 2010 at a Wirral History & Heritage Open Day. A photograph showing items from the Battle of Brunanburh project on display at the event is posted on the website. It has been noted by some that several of the items displayed on the photograph are now lost and therefore not available for study. Another part of the website mentions research into Wirral's Roman roads. This is relevant to the search for the Battle of Brunanburh project as many Roman roads would have still been in regular use during the medieval period. If the battle was indeed fought on the Wirral it would be reasonable to assume that one or more groups of the belligerents involved would have used a Roman road at some point before, during or after the battle. We have seen magnetometer plots of surveys carried out by WA on two areas of land, as part of research into Roman roads [locational data removed]. WA have not however published any material as a result of the research they have undertaken to date.

The WA questionnaire

The questionnaire sent out to the WA members was deliberately kept as brief as possible. Its purpose being firstly to request access to finds and records relating to the "Search for the Battle of Brunanburh project" and secondly so that the contributors to this report could gain an insight into the history and background of the group and its members as well as the research and metal detecting activity carried out to date. The questionnaire sent out to WA members was in the following format:

Thank you for your time in assisting the feasibility study for Wirral Borough Council. Please only supply data for sections where you have hands on experience or have undertaken research. It is important that where possible, precise sources of information are given.

Please indicate if there is any data you wish to anonymise, so we know where we can quote you in the final report and where we cannot.

Given that we are working to a tight schedule for Wirral Borough Council, all information requests need to be returned by **1st March 2020** in order to be considered for the final report.

1. How long is your association with Wirral Archaeology? In what capacity have you been involved in the project?
2. Can you give an account or supply any maps of areas where fieldwork and metal detecting have taken place? It is important that this includes areas studied without finds as well as the sites that were productive.
3. Can you supply any maps showing the distribution of finds? Otherwise, do you have any observations on areas that have been particularly productive?
4. What methods have you used to gather material e.g. how have sites been selected, how are areas surveyed, how is the research area divided up? what is the procedure for retrieving and recording

finds, how have methods developed over time? Nb. this is so we know how information has been gathered, which can help us evaluate it, it is not our role to judge the methodology.

5. How are finds stored? Is there a way of checking that all finds are accounted for (so not lost in transit etc)
6. Are there any lists of finds? Please supply copies of lists (e.g. records from find days), please can you provide a copy of the database? What plans are in place to continue inputting data? Is there a way to ensure data is stored and backed up so it cannot be lost?
7. Can you provide fully referenced information to any aspects of argument for the battlefield location including a. place-names - sources and the earliest recorded attestation of each name that you know about b. any topographic surveys and interpretation c. any battlefield landscape assessments d. consideration of battle logistics. For this question, if unsourced information cannot be verified it cannot be included – please provide specific references.
8. Do you have any observations on sites studied in addition to finds recovered (i.e. the sort of information that might not go on the finds database) this might include observations like any notable discolorations of soil/ organic or stony deposits including charcoal in a certain place, any observations on possible manmade features from surface analysis (e.g. notable humps and bumps). Has there been any field walking exercises? If so, please give details.
9. Do you know of other archaeological research/ any finds from this area, please supply as many specific references as possible.
10. Do you have any other thoughts or theories you would like to share?

Notes and observations

From the responses received by email to the questionnaire, discussion with WA members face to face and visits to site, the following notes and observations were made:

It would appear that whilst the majority of the group have been members for several years, a few members have been part of WA or its predecessor, for decades. The primary capacity of most members has been that of engaging in metal detecting.

For most members, the metal detecting activity has been confined to [locational data removed]. Members were not able to supply any maps or provide other data to illustrate or describe any methodology employed or provide records for previously researched land, whether productive or not. However, this writer did note that on several visits to [locational data removed] that the field had been gridded with survey flags to provide designated areas for members to detect in. However, it is not clear what methodology was employed in this procedure.

No maps or other data was available to illustrate the finds distribution within any parcels of land. All members stated that [locational data removed] was a most productive field, producing several thousand finds. The productiveness of this one field appears to have steered the group away from detecting other areas while they concentrate their efforts within that field.

During the site visits to [locational data removed] by this writer, I observed that members were recording the find location then completing paper finds sheets for each find and placing them within the plastic finds bag.

The finds are currently held in a local storage facility having been catalogued by the WA members, although it would appear that until recently finds had been stored in bulk bags and boxes within a garage with no on or off site record to account for finds. In late 2019 "finds processing days" were instigated, whereby the details of finds were recorded onto master sheets in order for their details to be entered onto a database. WA members, university students and members of other heritage groups attended to assist in the recording of the reported 4000 finds. One of the WA members also started systematically photographing all the finds. Whilst we have been supplied with spreadsheets containing the recorded details of some of the finds, at the time of writing work on the database is still in progress. None of the contributors to this report therefore have yet had sight of this database.

Some of the WA members have been researching the history of the battle of Brunanburh by consulting various published sources and have also been involved in informal landscape and battlefield logistical and tactical assessments. We have however been provided with a copy of the research carried out by Dave Capener, an ex serviceman who has used the expertise gained from his service in the British and French armies to evaluate the Wirral landscape from a military perspective. This work has recently been published under the title "Brunanburh Battlefield Assessment".

One WA member mentioned various finds being made over the years. Some that, in their opinion could possibly be battle related. However, these finds were not made available to us to study and no records appear to exist of the finds. [Confidential information removed]

Discussion

As can be seen from the above notes and observations, despite the years spent by members searching for evidence relating to the Battle of Brunanburh, from a research perspective the project is still very much in its infancy. The metal detecting that has been carried out in recent times has concentrated almost entirely on one field. [confidential information removed]

The recovered finds – methodologies employed for recovery and assessment

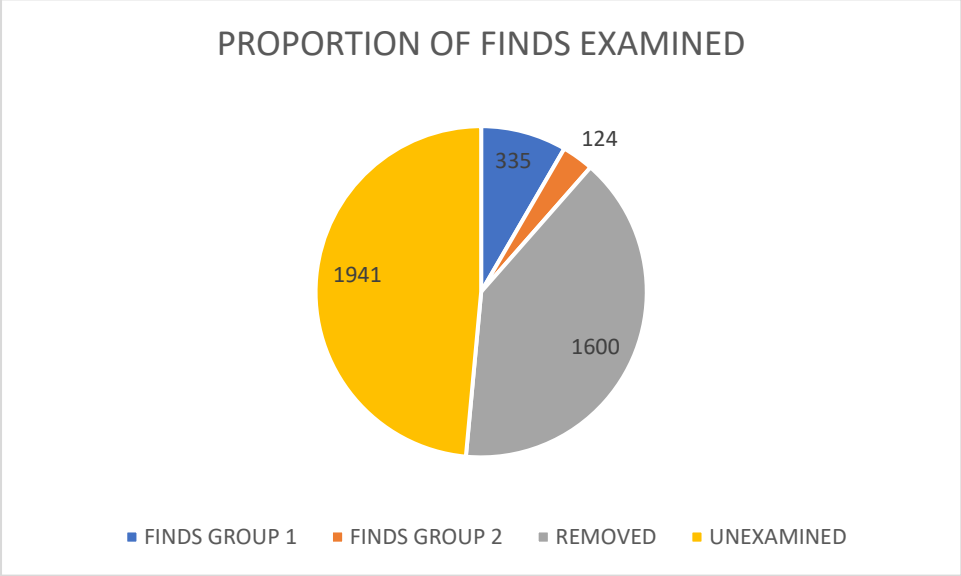
Whilst WA has no record of the methodology employed whilst metal detecting, it would appear from talking to WA members that all detected material is removed from site once excavated, having been subject to the recording process in the field, noted previously. It would appear however that there is no particular methodology adhered to in carrying out metal detector surveys such as are generally employed by archaeologists utilising metal detecting as part of a multi-disciplinary approach to researching a site. Generally speaking, metal detector surveys would be carried out using similar methodologies employed in other archaeological surveying techniques performed over a large area such as geophysical surveys or field walking where the area to be surveyed would be divided up into a grid and survey lines would follow regular transects in order to return data that is accurate both in terms of location and distribution of finds/anomalies etc.

This writer and Clare Downham provided practical assistance to WA in the setting up of "finds processing days". At these events we provided staff experienced in finds processing as well as volunteers to assist WA in processing the vast number of finds. Whilst no initial records existed, this was estimated by WA to be approximately 4000 items.

Prior to the 2019 finds processing days, WA had segregated material they deemed to be relevant to the project or otherwise thought to be interesting in its own right. This material formed the basis of public

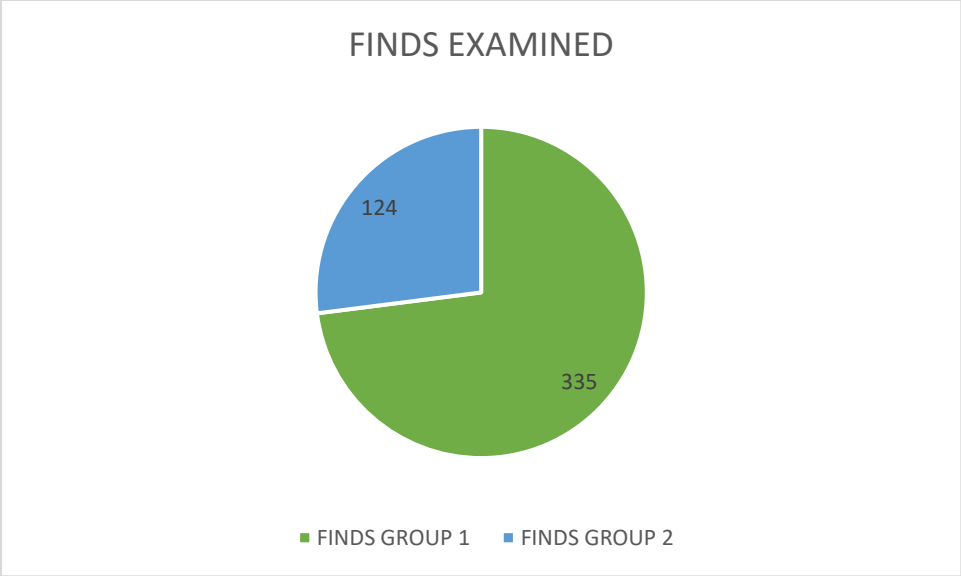
displays relating to the project. Once the remaining material had been processed by WA, it appears that approximately 1600 items have been identified by WA as modern and removed from the corpus of material made available for this assessment. From the total of c.2400 items their members identified further "items of interest" to add to the original display material. This resulted in 335 finds (labelled FINDS GROUP 1, just under 14% of the reduced total of 2400) being deemed by WA as potentially of interest. However, in order for an objective assessment of the finds to take place, material from the remaining objects needed to be examined also. Due to the limitations imposed by the nature of this initial assessment, this writer opted to select a minimum 5% sample of finds from the remainder within the WA store. These would have to be selected on an entirely random basis in order to provide a representative sample of the type of finds recovered by WA. The finds sample to be included within this assessment were chosen by their WA finds number only so as to be an entirely blind selection. As a result of this random selection process, a further 124 finds were included within the assessment for examination (labelled FINDS GROUP 2, amounting to 6 % of the remainder), with a recommendation that further finds assessment takes place until all the recovered material has been examined and catalogued.

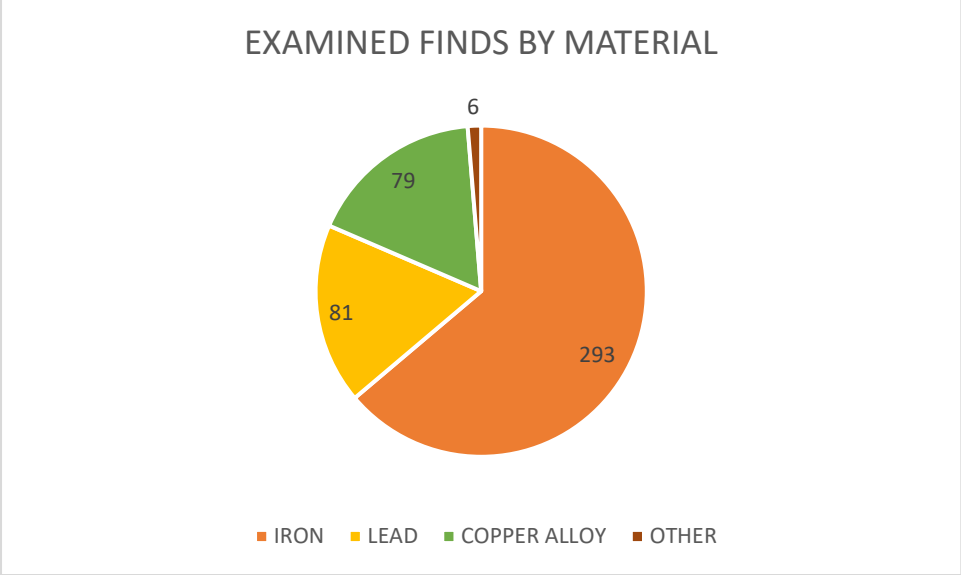
Examined, unexamined and removed finds as a proportion of the entire corpus of material



It is not known who identified the c.1600 finds identified as "modern" etc or what methodology was employed as regards any finds retention policy.

Of the 459 finds that were made available for examination within this assessment, 335 were from group 1, selected by WA as being of potential interest. The remaining 124 were from group 2, chosen entirely at random from the remaining material in storage to provide a sample that would be indicative of the types of material likely to be contained within the unexamined material recovered by WA.





CONDITION AND STORAGE OF FINDS - Paul Sherman

As can be seen from the chart above, over 60 % of the corpus of material examined for this assessment consists of iron objects, the remainder being evenly split between items comprised of either lead or copper alloy. There were a couple of ceramic finds, examined by Robert Philpott and one fragment of bone recovered. The bone was examined by Poppy Price of LJMU, one of the forensic anthropology students who we have on work placement with me at PHC Services. Her report is included later on within this work.

Iron objects can suffer a much greater degree of corrosion in the conditions encountered at the find site than those made of lead or copper alloy. It is therefore the iron finds that tend to require the most treatment post excavation to ensure their stability.

The prevailing environmental conditions that archaeological ironwork has been subjected to whilst buried has an enormous impact on the condition of the finds when excavation takes place. The length of time that

the object has been subject to those conditions whilst buried also has a bearing on its condition. A soil sample from [locational data removed] was sent to NRM laboratories for analysis as part of this report (see appendix). The soil, which is a sandy loam, had at the time of testing, a pH value of 6.1, which is classed as slightly acidic.

The environmental conditions between deposition and excavation are in turn affected by both natural and man-made actions. The extent and rate at which the natural corrosion process proceeds is governed by the properties of the iron object itself as well as the chemical and physical properties of the soil. In the case of iron objects within the plough soil, the presence of chloride ions can cause significant corrosion whilst processes that can affect the soil properties and the objects buried within include agricultural activities. Cultivation can cause physical damage to an object, the damage caused can include the cracking or other removal of the products of corrosion surrounding the object, thus exposing the iron work within to further corrosive action.

Iron readily corrodes in the presence of water and oxygen, the presence of other agents or further actions as noted above can affect the rate of corrosion considerably. As the corrosion of iron proceeds, the products of corrosion, mostly oxy-hydoxides, migrate into the surroundings often forming an amorphous mass of concretion that completely envelops the object. (Rodgers, 2004) This can be to such an extent that the resulting mass bears little resemblance to the object contained within.

The pH of a soil and the redox potential of buried objects are significant factors when it comes to how conducive the soil is to the preservation of objects. The soils of the main find site would not appear to be conducive to the preservation of buried iron objects, sometimes resulting in their total destruction. The area from where the bulk of the finds have been recovered is also subject to intermittent waterlogging, thus increasing the potential for corrosive action by the introduction of oxygenated water. The degradation that takes place will in general be more marked if the object is constructed from material of a relatively small cross-sectional area. More massive objects stand an increased chance of survival under these harsh environmental conditions, albeit contained within large masses of concretion.

In contrast, lead and its alloys as well as copper alloys fare much better under the environmental conditions encountered on site. Lead objects usually become coated in one or more lead oxides, but in general will be in a more stable condition on excavation than any iron object buried for a similar length of time. The small number of copper alloy objects recovered from the site similarly are in a relatively good state of preservation.

Each of the finds has been examined and graded as to its condition. The grading system employed attributes the numbers 1 – 5 to each object. 1 denoting that the object requires little or no conservation, 5 denoting that the object is subject to extensive active corrosion and disintegration. All the examples shown are from the material submitted for examination.

Examples of condition grades 1 to 5

Condition 1

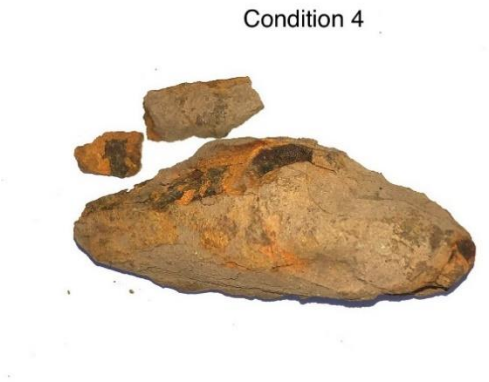
Items of condition grade 1 are in a generally stable condition and require little or no conservation.

Condition 2

Items of condition grade 2 are in a stable condition as grade 1 but require cleaning.

Condition 3

Finds of condition grade 3 require conservation but are not necessarily at immediate risk. There are various conditions that could be placed in this category. In the example illustrated here, a large, generally stable piece or iron, shows a small area of weeping corrosion caused by the presence of anions trapped within fissures in the metal. This type of corrosion can progress even when the object is stored in a dry environment. In this particular example, the object is not at immediate risk but will require some treatment. Such corrosion can however continue unseen below the surface and in some cases result in severe degradation or even destruction of the object. It is for this reason that finds processing, assessment and if necessary, stabilisation, should take place as soon as possible following excavation.

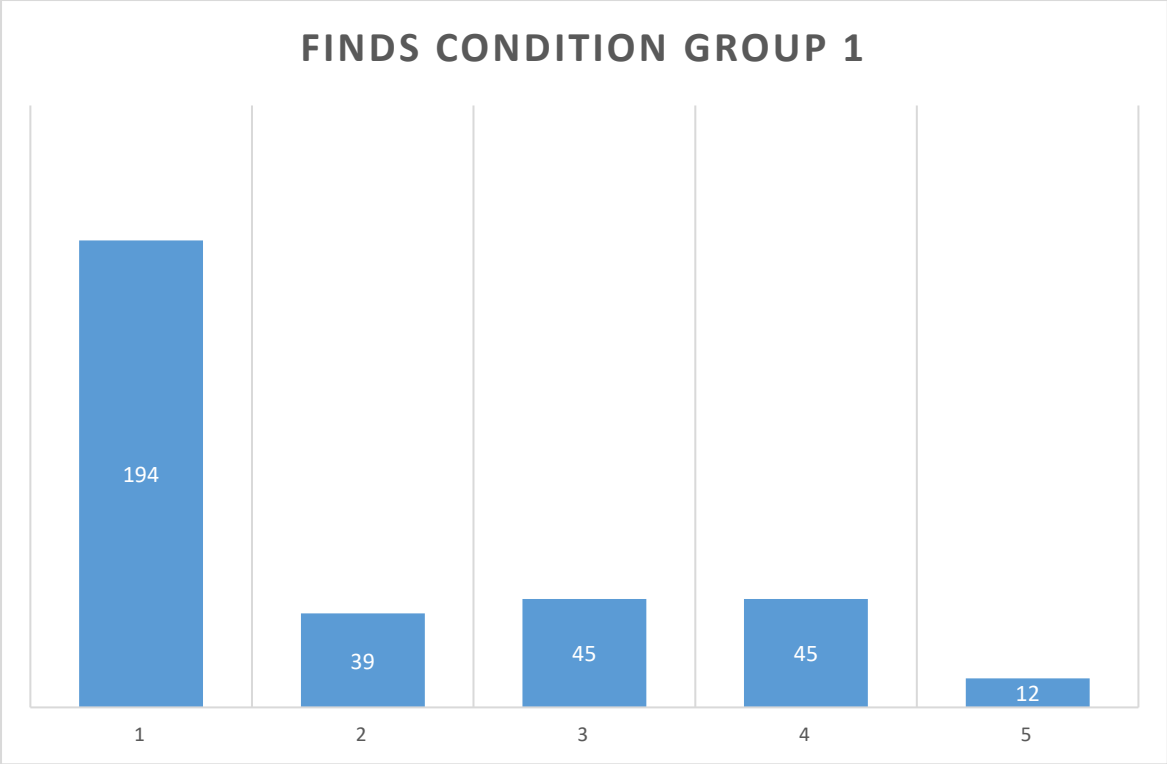


Finds of condition grade 4 require more immediate attention as the processes of corrosion have already resulted in the loss of some material through pitting, flaking etc. Even when the detached material appears to consist only of concretion, this also generally results in the loss of some surface detail from the parent metal. It can be this very detail that can make all the difference when trying to obtain useful data from an object.

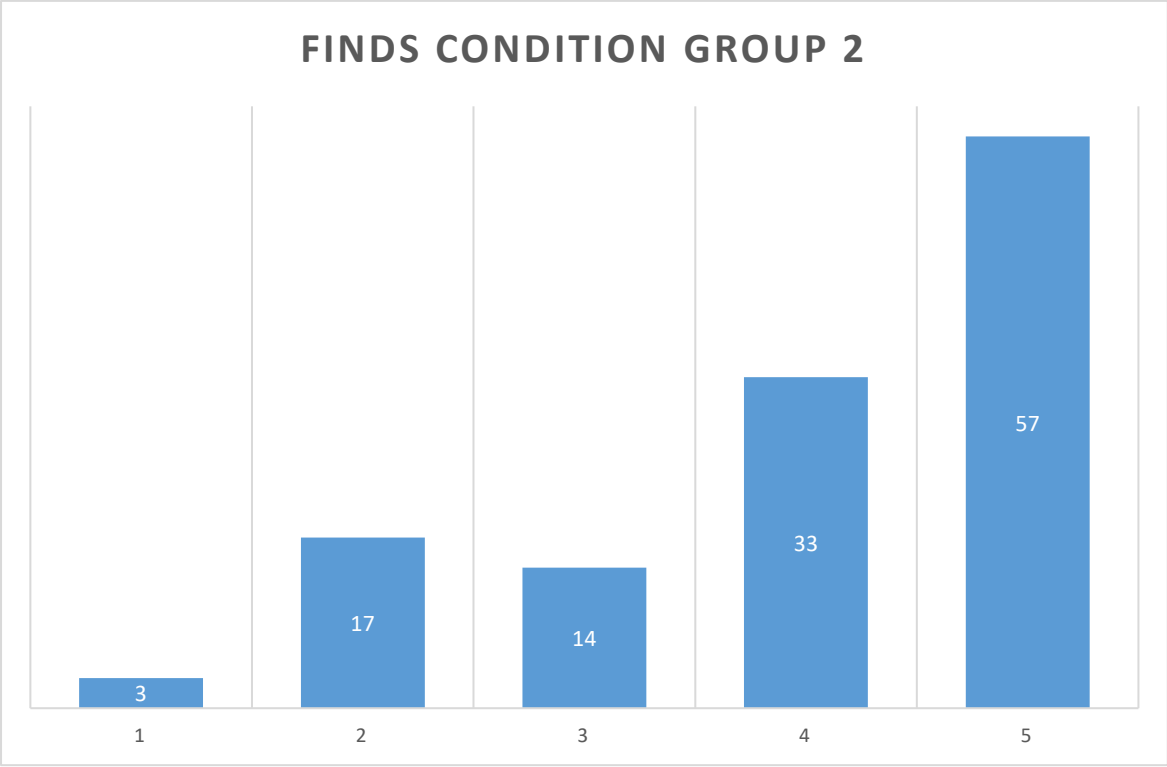
Finds of condition grade 5 are very fragile or have already fragmented due to the processes of corrosion.

Results of condition grading

The results of the condition grading of the finds are displayed on the bar charts below. Finds within Group 1 being much of the material identified as being of interest by WA. A large proportion of this material forms the basis of the material displayed at public events etc.



The finds within group 2 are those randomly selected from the remaining items in storage once the items in group 1 had been segregated by WA.



As can be seen from the bar charts, the proportions of the various grades in group 2 is in general the inverse of those within group 1.

The reason for this particular spread of grades across the two groups is twofold. Firstly, a large proportion of the finds within group 1 are non-ferrous and as previously stated have survived the environmental conditions whilst buried much better than objects made of iron. The second reason being that as this group of finds contains much of the display material, it has probably been stored indoors.

The finds within group 2 however are all composed of iron and therefore inherently more likely to be in a poorer condition on excavation. In addition, it is understood that much of this material has been stored in plastic bags within an outbuilding. Should ironwork be stored in such an environment, it is highly likely that the conditions encountered will accelerate the degradation of the material due to moisture from the finds being trapped within the plastic bags which are also subject to fluctuations in temperature. These conditions allow the chemical processes of corrosion to continue unabated and may result in the complete loss of some items.

As can be seen from the above, the environmental conditions encountered at the finds site appear to be particularly deleterious to iron objects. In addition to the processes occurring during burial, further degradation begins as soon as the iron object is excavated. On excavation the damp iron object is subject to an oxygen rich atmosphere and an increase in temperature which can hasten the corrosion processes. The drying of recovered iron objects in itself does not necessarily totally prevent further deterioration, but it may help. Some objects may start to exhibit signs of dry cycle cracking: The presence of the acidic micro-environment surrounding the object allows the corrosion processes to proceed. The expansive build-up of corrosion products, often caused by the presence of chloride ions can cause cracking and the eventual destruction of the object, by material flaking away from the surface or beneath the surface of concretion.
Example of dry cycle cracking: As expansive corrosion processes proceeds, material starts to loosen and flake and can in some cases lead to complete disintegration

In the case of concreted objects, these internal processes can take place with no or little apparent change on the objects surface until the whole mass disintegrates. In addition, weeping corrosion as illustrated above, can also occur where droplets of liquid corrosion products form on the surface of the object despite being kept at a relatively low humidity. This is another indicator that corrosion processes are still occurring. As a general rule, active corrosion processes need to be halted as soon as possible after excavation takes place to ensure that further degradation of the iron objects does not take place.

Examination of the excavated material shows that the iron objects were not subject to any treatment that would help to stabilise the finds or otherwise reduce the effects of ongoing corrosion processes to any degree until examination and assessment of the finds took place. Probably due to the environmental conditions within the outbuilding used for storage of much of the material, many of the iron objects displayed signs of dry cycle cracking. A further much smaller number show signs of weeping, signifying that active corrosion is still taking place. A small number of finds storage bags were also damp inside. In others, where objects were subject to dry cycle cracking, much of the surface had spalled away leaving a greatly reduced object surrounded by a mass of flaky material. During the examination of the iron objects it was noted that many are now of a weight considerably less than originally recorded by WA, due to dry cycle

cracking leading to flaking and subsequent disintegration. Due to the deleterious conditions of the site on buried ironwork, the post excavation treatment of recovered material becomes a crucial aspect of the project. Poor planning and inadequate provisions for finds post excavation can quickly deprive any project of the very information it is designed to research.

Therefore, it can be seen that whilst the iron finds have in many cases been in a poor state of preservation on excavation, the lack of any post excavation assessment and treatment coupled with inadequate storage conditions has led to their further degradation.

Following the initial inspection of the material and advice given, WA are now implementing a more robust finds assessment and storage policy to ensure as the project progresses as little degradation takes place to recovered material as possible. We understand that the group now also has the use of an indoor storage facility. It is hoped that further examination of the remaining material can take place at the earliest opportunity in order to carry out assessment and treatment and to ensure that moving forward the objects are being treated and stored in a suitable manner to ensure their preservation. Once stabilised, it is recommended that any significant objects are placed within the stewardship of a local repository where they can receive the correct curatorial care in optimum storage conditions.

Limitations imposed on the assessment of the find sites – Paul Sherman

The principal finds site at [locational data removed] has yielded an enormous number of finds, with WA having recovered objects dating from the Roman period to the 19th century. However, assessing the WA project to date is not without its limitations. Such limitations having arisen by virtue of the methodology employed, or lack of, by WA in surveying, recording and finds retention policy together with others imposed by the site conditions and the subsequent deleterious effects these may have on the buried objects themselves.

The excavation of archaeological remains from well stratified contexts is key in establishing the chronology and the resultant narrative for an archaeological site. In this particular instance, no archaeological excavation has taken place, all of the finds have been located and recovered from the plough soil by the use of metal detectors. Generally speaking, the only information recorded by the finders of such material that will provide any context whatsoever will be the find location. Whilst it is inevitable that some limited translocation of buried material will have taken place due to the agricultural practices employed on the site, the geospatial data generated from the combination of find and find location recorded by WA becomes crucial in the site evaluation process. A recovered object without a recorded find location is merely a curiosity. In isolation it adds little or nothing to our understanding of the site and the events that led to its deposition.

It must also be borne in mind that finds recovery on the sites investigated by WA has been highly selective, with buried objects being located solely by the use of metal detectors. Therefore, any non-metallic objects that may be present on site remain unrecovered and therefore unavailable for study at this time. It would appear from discussions held with WA members that once [locational data removed] started to yield substantial amounts of material, future efforts were then concentrated within this one field. Whilst this has resulted in several thousand objects being recovered, the fact that they are substantially from one field places an enormous bias on the data for the area as a whole.

As noted in the previous section on condition and storage of finds, a further hindrance to the assessment is the condition of the recovered finds. Due to the conditions at the site where the vast majority of objects have

been recovered, many are displaying signs of corrosion to varying degrees. The iron finds are particularly prone to severe corrosion in this respect. Some are/have been covered in a thick concretion of corrosion products that hinder the identification of the find. The corrosion processes may be so advanced at the time of recovery to have all but destroyed the object within, most of the parent metal now being lost to the surrounding concretion.

Where site conditions result in recovered material suffering from active corrosion, it is important that finds are suitably treated and stored to mitigate further deterioration by corrosion processes whilst a suitable program of cleaning, conservation and identification can be actioned. Without such procedures in place, finds, especially those of iron, are at particular risk of further deterioration due to ongoing active corrosion processes where uncontrolled environmental conditions prevail.

Despite the above limitations, the report will aim to provide as far as is reasonably practicable, a brief assessment of the site in terms of the character of the finds recovered to date, its research potential and value as a heritage asset.

SOME CHARACTERISTICS OF THE METALWORKING FINDS ASSEMBLAGE

Metalworking & Tools – Paul Sherman

The initial examination of the WA finds shows the assemblage to consist of material that is diverse both chronologically and in type of objects recovered. Later in this report Rob Philpott will provide an initial assessment of the entire assemblage whereas in this section I will briefly discuss some of the recovered material and its potential significance both within the context of historic activity on the site and also its potential for further research.

The main finds site is unusual in several ways. Firstly, the sheer number of finds recovered by WA, amounting to several thousand. Secondly, the concentration of finds that appear to be related to manufacturing crafts, especially metalworking. The metalworking related finds consist of the following:

A. metalworking tools,
B. raw materials used in metal production,
C. the products of metal production
D. the by-products of metal production

Metalworking Tools

A pre industrial metalworker required more or less the same basic tools in order to carry out his work regardless of whether he was carrying out his craft 2000 years ago or a few hundred years ago. Despite the passage of time, the processes involved in the small-scale production and working of metal have changed little. Consequently, the tools associated with such practices have also changed little. As a result of such conservatism, dating such tools in isolation, without the benefit of any real context can prove to be problematic. There are modern examples of such tools to be found in the forge today that are virtually identical to early medieval types on display in museum collections.

As most of the semi finished metalworking material recovered by WA consists of iron in the form of billets or bar etc, it is reasonable to assume that at least some of the metalworking tools recovered are related to the working of iron although many may well have been employed in non-ferrous metalwork also. Although the processes involved in working iron and non-ferrous metalwork require many different types and sizes of tools, some of the commonly used ones include the following:

tongs to pick up and grasp hot pieces of metal to be worked
hammers to strike the metal to shape it
an anvil or stake to provide a hard surface on which to place the metal whilst it is being worked.
punches, to make holes in a piece of hot metal
drifts, similar to a punch but used to enlarge or shape a hole not to create it
mandrel, used to shape rings or sockets, often conical
sets, these are chisels used to cut metal, some whilst the metal is hot others for cold cutting.
fullers, these are hammered into the iron (or vice versa) before drawing down material to a smaller section
swages, used to shape bars into a particular profile. In addition to smithing tools, picks, hammers and chisels may have been used on site to break up metal ores as part of the process involved prior to the smelting of the ore.
Examples of various tools recovered to date by WA include the following examples, however this is not an exhaustive list of every such type recovered.

Tongs

WA9964 One rein from a very short set of pincers or tongs, 120mm long.

The reins of these very short tongs are just long enough to grip, providing the thumb is almost at the offset near to where the pivot point was once situated. The rein itself is made from iron, currently, c. 12mm x 6mm in section at the thickest end then tapering down gradually in one dimension to a rounded terminal, although it is not known how much material has been lost through corrosion as the concretion had been chipped away prior to examination. (c.f. Goodall, 1992, fig 2.4)

WA9965. One rein from a light pair of wrought iron tongs. 200mm long.

The curvature of this rein matches WA9970 but is slightly narrower in section, partly due to loss of material through corrosion. There is the possibility that these two are originally from the same tool. However, no findspot information is available for either item so this possibility remains mere conjecture. The terminal is tapered, being drawn down to a point. The slight form of these reins suggest that the tongs were used for grasping small light weight pieces. They would not be able to stand up to the rigours of tightly gripping large sections of hot iron during forging operations. Therefore, it may well be that these were used for light non-ferrous metal working, although the lack of any jaws prevents further interpretation as to what particular use they were put to. They potentially could have been used as crucible tongs during the pouring stage of casting lead for example or may have been used to grip small pieces of metal whilst working on them hot or cold. (c.f. Goodall, 1992, fig 2.4)

WA9970. Partial rein from wrought iron pincers or short tongs, 150mm long

One rein from pincers or a short set of light wrought iron tongs. The terminal is drawn down to a point. This could well be the other rein to one set of tongs along with WA9965. The concretion that was clearly once surrounding this item has been mostly chipped away before the object was examined. The damage to the jaw end of the rein has possibly occurred during this process**.** (c.f. Goodall, 2011, fig 2.4)

Hammer

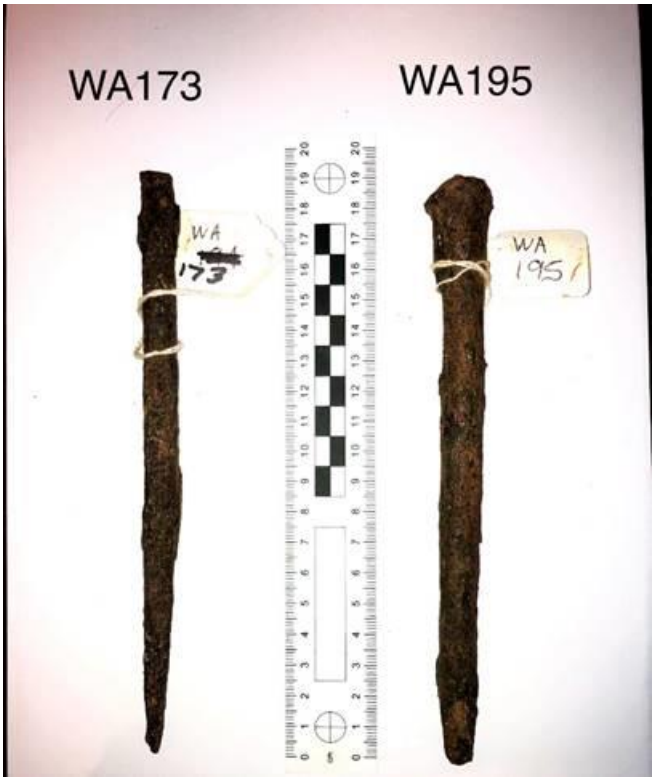
WA49 small iron hammer, head 70mm long x 15mm dia, iron shaft 80mm long

This small iron cross pein hammer with integral iron shaft weighs only 180g (just over 6oz) complete. It appears that it is constructed from two pieces, the shaft being welded into a punched eye within the head. The tiny size and low weight almost precludes it from being used in a general purpose ferrous metal working capacity. It would however be the type of hammer expected to be used in working on small section hot ferrous material as well as cold non ferrous material, For similar (c.f. Goodall, 2011, fig 2.5, A32)

Hardy, 37mm tall x 13mm wide (tentative identification)

A hardy is an upside down chisel, its tang being set into a wooden block or nowadays into an anvil. It is used to cut material by hammering material onto the cutting edge of the hardy. This item, if it is indeed a hardy, is small, its cutting edge being just 13mm wide, although a considerable amount of now detached material has fallen away at some point from it. The modern day equivalent of this, such as may be found in the modern forge is approximately 50mm wide. The cutting edge is worn and rounded on one side and the shank is largely missing. The small size of this complements the tiny hammer WA49 discussed previously but there is always the possibility that this item had an alternative use and simply shares similar characteristics with a hardy.

Punches WA173, WA195



WA173 185mm long, 11mm x 12mm
Iron hand held punch, square in section, the taper drawn down evenly to a point over approximately a third of its length. No obvious burring to head to indicate prolonged use. (Goodall, 1992, fig 2.6)
WA195 185mm long, 13mm dia
Possible punch, round in section with a short taper to the point. Some burring of edges of top face commensurate with hammer strike. (Goodall, 1992, fig 2.6)
WA9966, WA9967

Two potential punches, both square in section, with signs of burring to the head of each but so heavily corroded that further comment will have to wait until cleaning and conservation has been carried out on these items.

WA9961 Drift, 120mm long, 18 x 20mm at thickest point

The blunt terminal of this iron drift is sub triangular, flaring out to square sectioned material along the body. No apparent burring to the head, though a lot of material is now detached from this item through flaking. (c.f. Goodall, 1992, fig 2.7, A76 – A85).

Chisels
WA173, WA194, WA1780

WA173 is constructed from round bar c. 10mm diameter, the lower 40mm being reduced to a sharp chisel point. The fine edge to this may suggest it was used to work on small sections of hot metal or perhaps wood.
WA194 is constructed in the same fashion but of longer and thicker material. Its cutting edge is also quite fine but slightly rounded.
WA1780 is slightly ovoid in section with flattened sides. It is both shorter and thicker than the previous chisels but has a fine if somewhat rounded cutting edge. This chisel had traces of copper compounds within

the concretion surrounding it as well as a small patch close to but not on the cutting edge. (c.f. Goodall, 1992, fig 2.5)

Mandrels
WA164, WA178

WA164 A mandrel used for forming small rings, but the form is such that it could also be used to fabricate tapering sockets made from an acute triangle of sheet material. It would be fitted with a long wooden file type handle. The photograph below shows WA164 side by side with a spearhead from another site showing the close similarity in taper such that it can be used to form sockets on any tool or implement that would be fitted to a wooden shaft. In use the smith holds the workpiece with tongs in one hand and his hammer in the other while his assistant holds the mandrel. The assistant then slides the mandrel into the heated rough worked socket and holds it there while the smith controls the piece and works it to get it true. The body of WA146 is very similar to modern day anvil mounted mandrels. (c.f. Goodall, 1992, fig 2.7. A87)

WA178 is a mandrel of similar construction but a much smaller example. (c.f. Goodall, 1992, fig 2.7, A88)

Reamers WA1186, WA169, WA175

These share similar characteristics in that they are all of similar length and the bodies are of tapering square section between 11 -19mm with a slight shoulder where the iron has been drawn down to form the tapered tang. They could be used to enlarge holes in metal or wood. (c.f. Goodall, 1992, fig 3.8, B103-B106)

Wedges

WA199, WA167

WA199 Wedges such as this could be used to rive stone or timber. WA199 tapers progressively from the head to the cutting edge on two sides, the other sides being parallel. The head is burred on two opposite sides in line with the cutting edge. It could feasibly be used for either purpose. (c.f. Goodall, 1992, fig 3.9, B131)

WA167 being considerably shorter would more likely to be used for splitting masonry. This example although again tapers from the head to the cutting edge on two sides, has the other two sides flaring outwards such that the cutting edge is longer than the head. It has considerable burring to the head consistent with heavy use. (c.f. Goodall, 1992, fig 4.1, C10/C11)

Pick WA1720

Iron pick with tapering chisel tip, one corner missing. The head has been punched for the eye and fitted with the remains of an iron shaft, the same construction method as hammer WA49. The head beyond the eye is very short, whether this is by design or due to damage is unsure. It is sub square in section, possible hammer face. (c.f. Goodall, 1992, fig 4.5, C51) It is feasible that picks such as this and wedges mentioned previously were used to break up metal ores on site in readiness for smelting.

Slice WA174

Slice type chisel with raised sides and slightly flared blade edge. Instead of the usual wooden shaft, the shaft is of iron in common with the pick WA1720 and hammer WA49. (c.f. Goodall, 1992, fig 3.9, B33)


WA174
0 1 2 3 4 5 6 7 8 9 10
cm
0 1 2 3 4 5 6 7 8 9 10

Iron billets/bar

Several good examples of iron bar and billets have been found, whilst many more poor quality fragments have also been recovered by WA. Further unrecorded examples within the assemblage were of a much larger section than those finds described below. See discussion on metalwork for details.

WA9968 Iron bar 150mm in length and c. 28 x 15mm in section. There is a slight curve to the bar so as to describe an arc. The outer edge being rounded, the inside edge is square.
WA176 60mm length iron bar of almost the same section as WA9968 but slightly smaller. The reduced dimensions could be due to loss of material through corrosion or it could have been manufactured to that size, 1 inch x ½ inch.
WA412 is a 140mm length of square bar c. 13 x 13mm in section. It is covered in a thick concretion of corrosion products. As such further comment will have to wait until it is cleaned and conserved.
WA44 is a wrought iron billet approximately 85mm long and 22 x 17mm in section. It has lost considerable material through corrosion which has since either fallen away or been removed before examination took place. There is extensive deep pitting of the iron to all surfaces together with remnants of relatively thick silicate slag on part of one surface.
WA53 is a small square section billet of iron, 120mm long and c. 15 x 15mm in section. The fine, longitudinal grain is visible along its length and the bar is well forged and generally true on all faces.
WA80 A small billet of 50mm long iron, c. 18 x 13mm in section. There is a considerable amount of flaked corroded material within the storage box so this item may have been much thicker when recovered.

Iron plate/sheet

Several pieces of thin section plate/sheet have been recovered from the site by WA. However, examination shows many of these to be not wrought iron at all but fragments of cast iron rainwater goods. There are fragments that are flat, some are angled. These appear to be fragments from cast iron ogee guttering, probably dating to the 19th century. Other curved sections, when checked against a rim chart are of 3" diameter, making them more than likely fragments of cast iron rainwater downpipe, again widely used during the 19th century.

As for some of the sections of apparent sheet iron, the condition of the recovered material is in general so poor due to corrosion that it is difficult to ascertain if the items in question are of their original thickness or have simply spalled away from an originally thicker section due to corrosion. Given the condition that other ferrous finds have been found in due to the soil conditions on site, it is highly likely that at least some if not all of such sheets are the vestiges of once much thicker sections.

Metal working residues

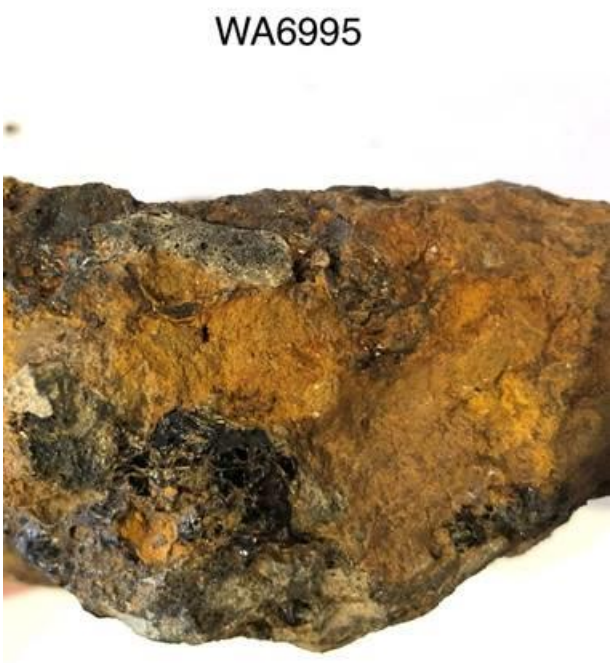
Apart from some examples of non-ferrous residues that were subject to XRF testing, no close examination or analysis of the metalworking residues has been carried out. Some examples recovered by WA include:

Iron working residues

WA6995, WA9958, WA9959

Bloomery iron and residues. Much of the slag has been driven out as consolidation has taken place, although some vesicular inclusions still remain.

WA6995 Bloomery iron, partly consolidated with some voids still present together with glassy slag and gangue embedded within the surface on one side of the mass.



Several other examples of evidence of iron smelting have been recovered, from heavy iron rich tap slag to frothy high silicate/ash slags.

WA1886 has two distinct layers comprising an upper layer of silicate and gangue overlying an iron rich gangue layer beneath

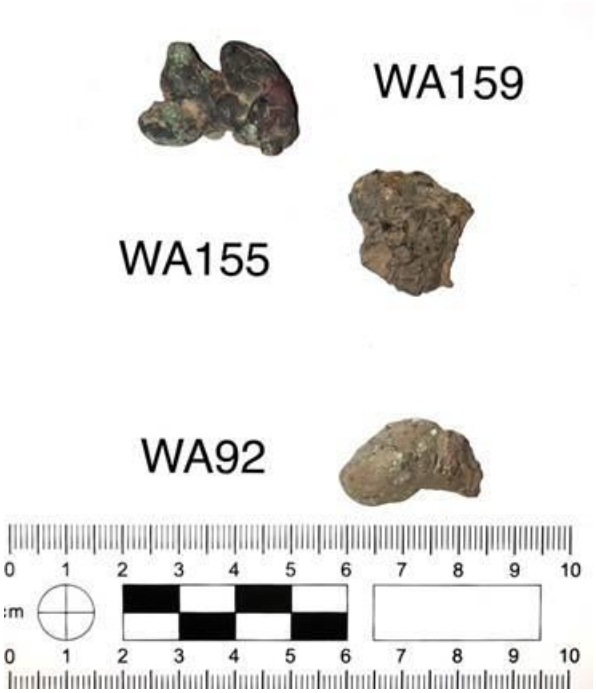
WA170 is an iron rich tap slag that in section exhibits at least 6 distinct layers, each representing the process of the slag running and solidifying onto the previous run beneath. Iron rich tap slags such as this (containing over 90% iron) represent a considerable loss of precious material from the smelting furnace, making the process very inefficient, Such inefficient use of resources would not expect to be found in post industrial iron production. (c.f. Historic England, 2018, Pre industrial Ironworks)

Non-ferrous metal residues

Copper – WA92, WA155, WA159

WA92 Copper slag that appears to been sheared from another piece. The exposed sheared face shows traces of silicates and small traces of iron. XRF analysis shows the sample to contain 54% copper and 25% silicon.

Some of the copper residue samples recovered by WA may have solidified in water as they comprise of individual globules or a botryoidal mass.
WA155 Copper spill, surfaces partially covered in copper oxides. XRF analysis shows this sample to contain 99% copper.
WA159 Copper fused to a thicker layer of slag with a distinct interface between. XRF analysis of this sample shows the metallic layer to contain 97% copper whilst the slag layer in common with WA92 contains 54% copper and 25% silicon.



Lead
WA6981, WA6979, WA6987
WA6981 Lead spill displaying signs of run as solidification took place. XRF analysis of this sample showed it to contain over 99% lead.
WA6979 Spill of molten lead onto soil surface, traces of galena and charcoal adhering to underside. XRF analysis of this sample showed it to contain 98% lead.
WA6987 Lead from smelting hearth run onto surrounding ground. The upper surface has puddled slightly, whereas the lower surface is highly irregular and contains a single fragment of galena and some small fragments of gangue. These were probably strewn on the ground around the hearth and have adhered to the surface of the lead as it cooled. XRF analysis of this sample showed it to contain 88% lead. The underside has been abraded recently, possibly by agricultural operations, as the exposed metal is only very lightly oxidised.

WA1157 is a flat ovoid lead ingot with a hole punched through near to one end. If not a weight, the hole could be simply an aid in the secure carrying or storage of the metal. Compare the similar perforated lead alloy ingot shown below it from Warton, Lancashire. (Sherman P., in progress, "The Warton Viking Age silver hoard.")

Discussion on metalworking – Paul Sherman

The types of tools recovered by WA are consistent with well-established metalworking activity on the main finds site. As noted previously, the relative lack of changes in design of many metalworking tools over time makes it difficult to date them in isolation. They remained virtually unchanged over hundreds of years. Once

archaeological excavations commence it may well be that these present plough soil finds could start to be placed within a site narrative as well stratified contexts are excavated and recorded.

It could also be speculated that some of the chisels, pick and masons wedges recovered could also be related to metalworking activities in so much that they could have been used in the breaking up of ores into smaller pieces to prepare them for roasting/smelting.

The presence of small, lightweight metalworking tools may be more indicative of lightweight non ferrous metalwork activity rather than forging iron, although the presence of iron smelting residues and iron bar stock suggest that both smelting and smithing were taking place on the find site. The presence of bar and billets could suggest that iron smelted on site was being reworked by smiths into bar form for the later fabrication of manufactured objects, but without further evidence this must remain conjecture and just one of several possibilities. It was also noted that there are a couple of unrecorded thick section billets, one was measured as being 35mm x 28mm in section. This appeared to be very regular in appearance, giving rise to the possibility that such pieces represent finished/semi finished items that have been completed with use of a flatter or filed/machined to a finish. Small section bars and billets are more easily and economically manufactured via small scale pre industrial metalworking techniques than large sections. As such it must not be ruled out at this stage that some of the larger section bar/billet material may well be of post industrial date and possibly worked under a power hammer rather than by hand. As research progresses it may well be that more evidence is uncovered to confirm or refute the tentative theories so far discussed.

There is considerable variation in the composition of the iron examined from the site. Some examples are comprised of almost pure iron. For example XRF analysis of WA53 showed it to be pure iron containing 99.46% iron with no trace of sulphur or phosphorous. Other samples when tested produced results indicating 95% iron with other metals including copper and lead included, plus sulphur and phosphorous. (nb. wrought iron can contain up to c. 5% slag inclusions) The presence of either sulphur or phosphorous can cause brittleness in iron. Sulphur can cause loss of ductility at the elevated temperatures required for forging causing the metal to fragment when being worked hot. This condition is referred to by blacksmiths as being hot short. Excess phosphorous on the other hand can cause the condition known as being cold short, that is the iron is liable to break through brittleness at low temperatures. In the photograph shown below of a hand pick, one of the two working tips of the pick has shattered across a considerably thick section of the tool due to brittleness caused by an excess of phosphorous in the metal. (photo: P. Sherman.)

The presence of manganese can reduce the sulphur content of iron as it combines with sulphur in the fire to form a slag that readily runs off from the metal. Almost all of the iron samples that contained sulphur also contained manganese. The presence of sulphur in some samples raises the question of its likely source. If high sulphur coal instead of charcoal had been used for the fuel for some of the iron working processes then this could possibly account for its presence.

There are also many highly corroded irregular shaped fragments of iron bar recovered by WA. Examination of these shows that their irregular form appears to be due to the presence of distorted and sometimes coarse

silicate inclusions within the bar. These have in turn provided the pathway for corrosion to progress through the material. As corrosion has continued, pieces have become detached leaving a highly irregular shaped bar as a result. WA6993 is one example of this type of bar. Many other fragments are evident, often with acute angles that give rise to sharply pointed forms. This has led to some of these being mistaken for weapons.

Good quality wrought iron can be highly resistant to corrosion in an outdoor environment. However, there have been cases of some wrought iron railings failing due to being manufactured from poor quality iron. It could well be that some of the iron bar samples recovered by WA have originally derived from poor quality iron that has at one time been made into railings or gates and been later discarded. The presence of pieces identified as railing fragments such as FS6, a fragment of decorative wrought iron scrollwork could well reinforce that theory.

Such variations in the iron as noted above also raise the possibility that not all the metalworking activities on the site were concurrent. It may well be that some of the iron bar stock recovered on the site is not contemporary with the iron working residues. In the same way, the lead and copper residues recovered on site whilst providing evidence for the smelting and casting of those metals, do not provide any evidence at this time to suggest these processes were contemporary to the iron working operations on site. It may well be for example that the smelting of non-ferrous metals was taking place during the Roman period and the iron working in the medieval, only archaeological investigation will provide the answers to such questions. There is much scope here for research into the metallurgy of the recovered metal and associated residues and the potential for the data thus generated to add significantly to the project as a whole.

Samples have been taken from a selection of potentially significant lead finds and submitted for isotopic analysis. This can provide information regarding the geographical origins of the ores used in the lead production. These samples are currently undergoing preparation and the results will be reported on once available and submitted as an addendum to this report.

Due to the nature of the metalworking activities described above, it is highly unlikely that the recovered items represent evidence for a post battle metal reprocessing site as suggested by the WA group. Metal smelting requires the transport of ore from the source to the processing site, together with large volumes of fuel to fire the furnaces. It is more likely that these finds represent an established industrial site rather than being an indicator of a short lived post battle camp that has been set up for the reworking of iron objects gathered from the field of conflict. The fact that there appears to be a considerable assemblage of discarded tools and part finished items could well indicate an unplanned and sudden cessation of metalworking activities on the site with no one returning at a later date to reclaim them. Such a complete abandonment of the site could well be consistent with a population collapse caused by for example a pandemic such as the

plague of the mid 14th century. However, there may well be other factors at play and much further research will need to be conducted to confirm such a hypothesis.

It has also been noted that there has been a very high number of nails recovered on site. Although some are constructed of copper alloy, possibly Roman in date, most are iron. Many of the iron nails are highly corroded, but there are some examples that appear to be flat clasp nails. As such they are quite likely be 19th century or later.

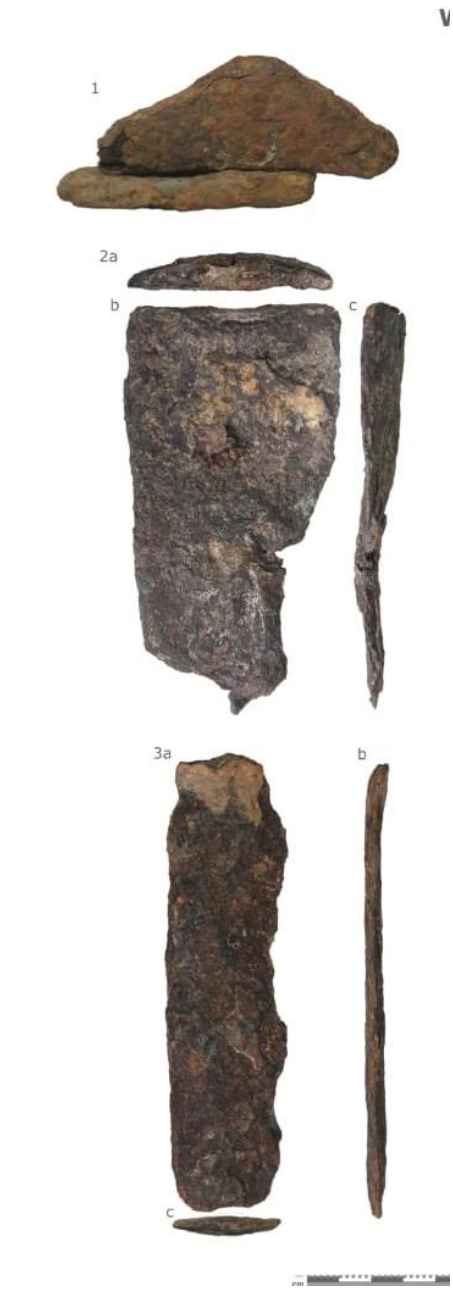
In conclusion, from the limited information that can be derived from the examination of the metalwork in isolation, it is likely that the iron remains represent several different phases of activity, with at least one of those phases possibly being the result of part of the site being used as a Victorian midden. The dumping and burning of old building timbers and other building related items would account for many of the nails recovered to date and also account for the presence of cast iron rainwater goods and fragments of iron railings. I also note from Rob Philpott's report that the material he examined includes the remains of parts of several toy guns and wheels from toys. This may provide additional weight to the argument that part of the field was being used as a midden from the Victorian period onwards. This material has the potential to mask earlier iron finds that become lost amongst the scatter. However, there are a sufficient number of metalworking related finds that are likely to be medieval or earlier date to make the site a potentially significant heritage asset in its own right. Noting the scarcity of such finds in the north west, this assemblage and the project in general has the possibility of providing a great deal of future research potential into historical metallurgical processes and the part played by this site within the historic landscape, noting that it is currently not recognised as being part of or in close proximity to a known settlement.

Discussion on the metalwork of potential battlefield related material – Paul Sherman

Following on from the examination of the tools, the objects originally identified as 'weaponry, blades and points' were examined. These consisted of potential sword blade fragments, a sword pommel, arrowheads and various other points. These items were examined visually to ascertain as far as possible their form, the possible processes involved in their manufacture and how such characteristics would agree with their being battle related. Some of these objects were then x-rayed to assist in the process as a considerable number of the recovered finds have suffered a great deal from the effects of corrosion. As such definitive identification could prove difficult from visual examination only.

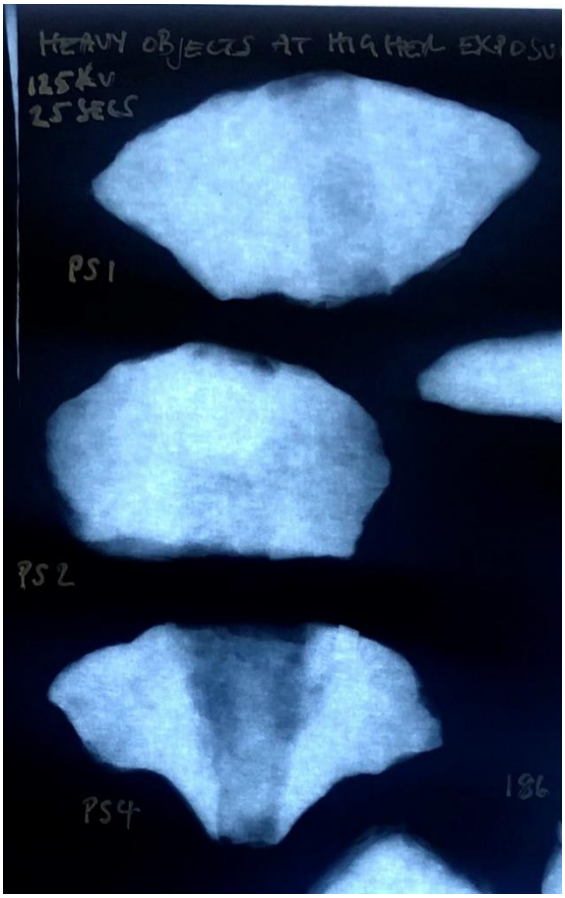
Sword elements

Fig Potential sword elements

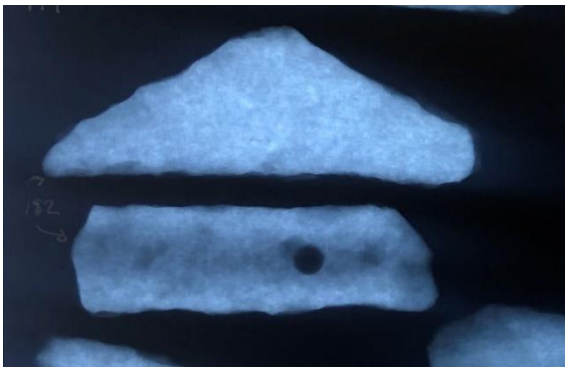


WA182a/WA182b These were originally identified by WA as being a sword pommel and pommel mount shown as item 1 on the above photograph. The two were however not found together but c. 1m apart when recovered. The form of WA182A is that of an isosceles triangle made of iron. The angles adjacent to the base (longest) side being exactly 30 degrees. It certainly has the outward appearance of a sword pommel of Petersen type H or I but is exceedingly corroded, having lost much of its original material to corrosion, including some to the corners so that they are now not quite symmetrical. However, visual examination of the base did not reveal any vestige of the tang at what would be expected to be the tang/pommel junction at the centre of the base. Usually this can be discerned on detached pommels with the naked eye. Should this not be ascertained, an x-ray of the object can be used to highlight the tang channel within the pommel. The photograph below shows three Viking Age sword pommels recovered from another Viking Age site, each showing the position of the tang within the pommel. (also c.f. Ottaway, 1992, fig 312, 3940)

(Pommels: P. Sherman)



However, the x-ray of WA182A shown below, displays a high degree of uniformity across the object with no indication of the vestiges of an in-situ tang within.



Similarly, **WA182B** at the bottom of the above x-ray does not possess an aperture for a sword tang to pass through to the pommel. Below is an x-ray of a Viking Age pommel mount from another Viking Age site showing the tang aperture and mounting holes.

Pommel mount (from another site): P. Sherman

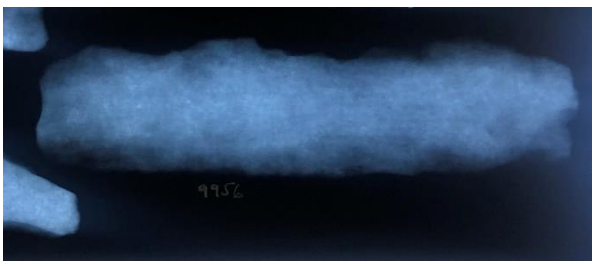
WA182B does appear to have a drilled hole that clearly shows on the x-ray but is not visible to the naked eye, being covered by the products of corrosion. The characteristics of these two objects make it unlikely that they are parts of a sword. Further investigation may well be required to ascertain their origin.

WA98 This is object 2 on the WA photograph and shown as a potential blade fragment from the hilt end of a sword, being 125mm long and 65mm at its widest. The photograph below shows WA98 overlying the hilt end of a Viking Age sword from another site. It is somewhat wider than would be expected and of an unusual profile, being plano convex. Both sides show considerable slag deposits left adhering to the iron as layers above have corroded and flaked away. X-ray of the fragment shows it to have a rectangular aperture which may well be punched across the longitudinal grain of the wrought iron. The top edge of the x-ray may well also show the edge of another such aperture, both of which are invisible to the naked eye.
Photograph: WA98 overlying a sword from another site (Paul Sherman)

WA9956 is labelled as object 3 on the WA photograph and is 138mm long x 37mm wide. On the image below it is shown overlying a Viking Age sword blade from another site, close to the sword tip. In common with WA98 it shares the same plano convex profile but of much smaller proportions.

Photograph of WA9956 overlying a Viking Age sword blade from another site (Paul Sherman)

Whilst it is shown to be of similar proportions to known Viking Age blades, the x-ray of WA9956 shows the longitudinal grain in the iron, but as with WA98 there is nothing that it reveals to provide incontrovertible proof that it is part of a sword blade such as blade profile, evidence of pattern or strip welding or for example, the presence of fullering to the blade. (c.f. Ottaway, 1992, fig 312, 3936)



Other potential sword blade fragments were submitted for examination such as **WA179**. However visual inspection of the surface corrosion showed it to be highly probable that it was made of cast iron. A small chip removed from a corner revealed this to be the case.

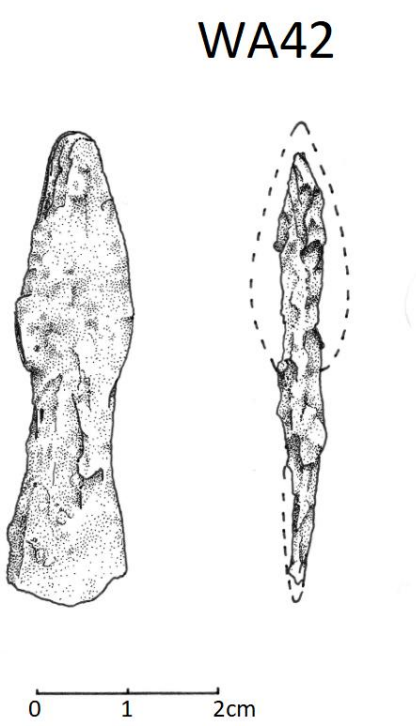
Arrows

WA42 as received, was in a very poor state of preservation, appearing to have suffered extensively from the effects of corrosion. There were many fissures within the considerable depth of concretion which surrounded the object. At first glance it appeared to be a socketed arrowhead of Museum of London Type 1/ Jessop type MP3. However, an x-ray showed it to be a tanged not socketed type. The conical concretion to the tang was due to the presence of a small lump of iron situated close to the tang terminal. The migration of iron via the corrosion processes had caused considerable localised concretion at this point. An x-ray also revealed that there was very little original material remaining within the concretion.

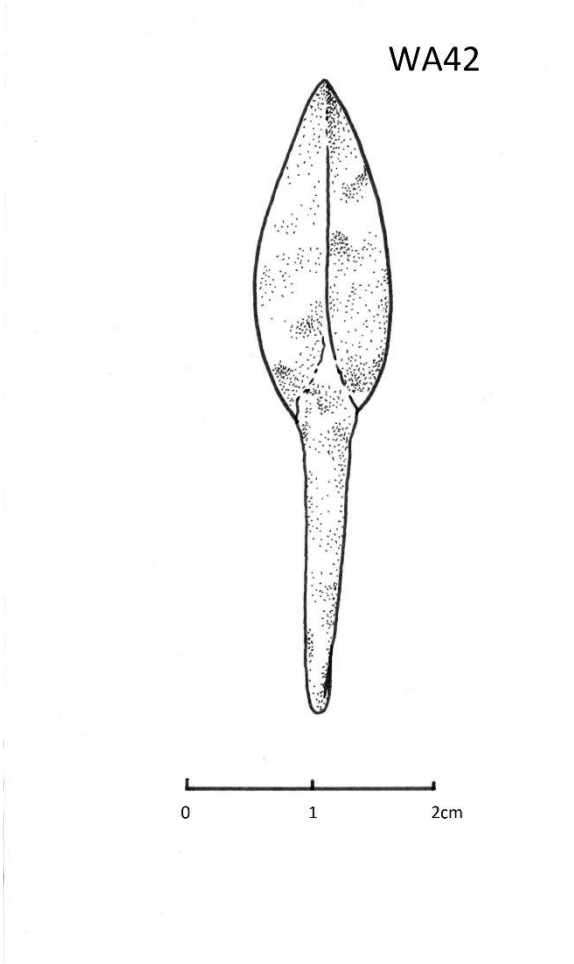
WA42 as received.

The remaining parent material within the concretion.

Due to the poor condition of this arrowhead the best that could be achieved was to attempt to produce a reconstruction based on a combination of the remains and the profile of the concretion to result in a possible original form. Obviously, this a tentative suggestion, based on the limited information available at this time. Due to the condition it impossible to state whether this arrow had a stopped tang or not.
Reconstruction by Dr J. Travis



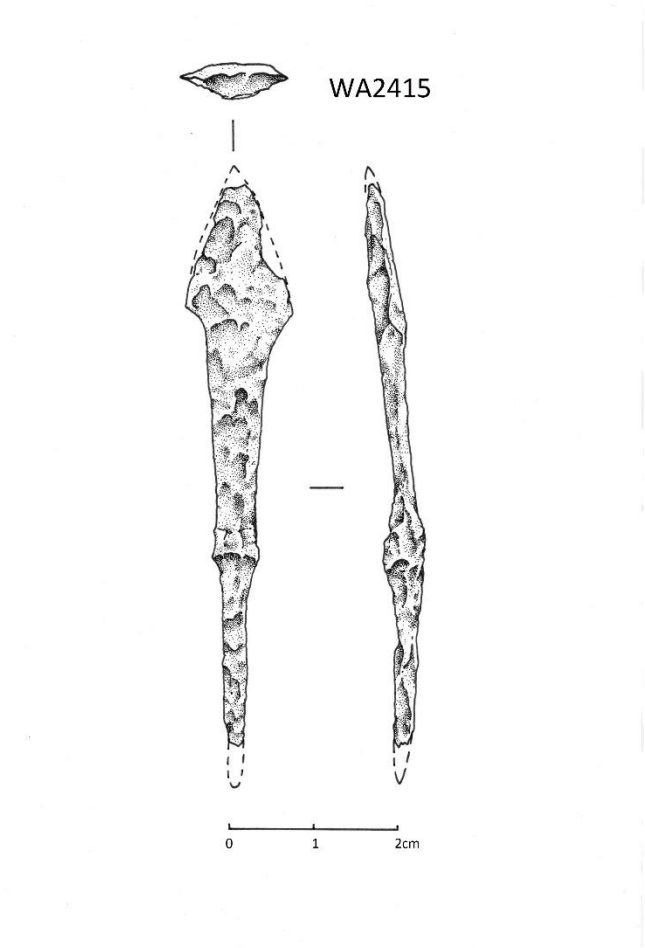
Based on the reconstruction, the arrowhead could possibly be of a Jessops type 1 or 2. (c.f. Jessop, 1996) (also c.f. Ottaway, 1992, fig 309, 3923). Credit: Dr J. Travis.



Two other arrowheads including WA1275 were recovered and submitted for examination. However due to their poor condition, these have crumbled and are now unidentifiable. Unfortunately, small section iron items such as arrowheads have little chance of surviving intact buried in even a mildly acidic soil. One arrowhead which did manage to survive was located in an adjacent field to the main finds site. It is not known what the soil type or conditions are within this particular field.

WA2415 is the arrowhead referred to above, which although originally found encased in a thick concretion, apparently cracked open to reveal the arrowhead within. It is almost flat in profile, as if manufactured from a thin section flat bar, with only a slight lozenge profile to the blade. It is 64mm in length although the end of the tang is missing. The blade is 13mm at its widest. One side of the blade is chipped through impact damage in use or sustaining damage whilst buried. The damage does not appear to be recent. This arrowhead belongs to one of the distinct Scandinavian types of arrowheads, tanged with a broad blade. As such it would represent a Wegraus type A / Halpin type 1 / Jessop type T1. This type of arrowhead is noted from Anglo Scandinavian contexts in York and an example from Carlisle (c.f. Ottaway, 1992, pg 711).

Drawing by Dr J Travis



Andy Halpin argues that this type of arrowhead represents over 80% of all arrowheads known from Irish contexts before 950. After 950 they are rapidly overshadowed in Dublin at least, by the armour piercing type, although they don't finally disappear until the 12th century. - Andy Halpin, pers. comment, (also c.f. Halpin, 2008)

Whilst the presence of this generic type of arrowhead is noted above, other examples of this particular variant have not been found in Britain as far as I am aware, except for one site currently being researched in west Lancashire. (P. Sherman, in progress.) Here, potential battlefield related finds have also been recovered and include arrowheads almost identical in design to the Wirral example above. Some have questioned whether the Lancashire site represents an unrecorded conflict as the forces of Constantine/Owain moved south across Lancashire towards the Mersey. Research is still at a very early stage on this material and such

speculation is not to be encouraged. However, ongoing research may well provide some answers regarding the circumstances surrounding the deposition of these finds in the future.

Other Weapons

No spears or other weapons were noted in the Wirral assemblage. This is not unexpected as following an early medieval battle it would be general practice that the victors would recover any items of use or value including weaponry, from the dead and dying on the field.

Fig: Scene from the Bayeux Tapestry with lower margin showing items being plundered from the battlefield

Due to this and the effects of corrosion over long periods of time on items not recovered immediately post battle, early medieval battle related finds are particularly rare.

Some items appearing on the original WA photograph as weapons are more readily identifiable as metalworking tools as detailed elsewhere in this report. Some items of iron bar appear to have fragmented into crudely pointed shapes. However, this may possibly be due to the nature in which the iron has corroded rather than by any deliberate manufacturing process, the corrosion appearing to have followed the coarse slag inclusions within the iron to produce the crudely pointed form. Further research may be required to confirm or refute this.

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https://historicengland.org.uk/images-books/publications/iha-preindustrial-ironworks/

Jessop O. 1996 'A New Artefact Typology for the Study of Medieval Arrowheads' *Medieval Archaeology* 40, 192-205.

Ottaway P. 1992 *Anglo-Scandinavian Ironwork from 16-22 Coppergate,* Vol 17, Fascicule 6, The Archaeology of York: The Small Finds, CBA York Archaeological Trust, York.
Rodgers B. 2004 *The Archaeologists Manual for Conservation: A guide to non toxic minimal intervention artifact stabilisation,* Springer US

Discussion of the possibility of the main find site being part of a battle field scenario - Paul Sherman

The main find site is situated [locational data removed]. This section is a very brief discussion of the pre-requisite conditions that would need to be fulfilled in order for this site to be linked to an early medieval battle, potentially the Battle of Brunanburh. There are several factors affecting choice of suitable locations for camp, lookout positions and the actual battle by the forces of the time. The combatants would need to assess the topography of the area in order to provide tactically advantageous positions for camp, lookout and battle site locations and the communication routes available to get men and supplies to and from the areas in question. The case for a mid-Wirral location for the battle has been studied and assessed by those researching the battle and various theories have been put forward based on that research, including proposed locations. It is not within the scope of this section of the work to repeat the outcomes of that research but to discuss whether the sites where potential early medieval material has been recovered would fit in to the narrative derived from such research.

Therefore, for the sites that are the subject of this assessment to be within or close to the area that the Battle of Brunanburh potentially took place, it is reasonable to assume that the following conditions would have to be met:

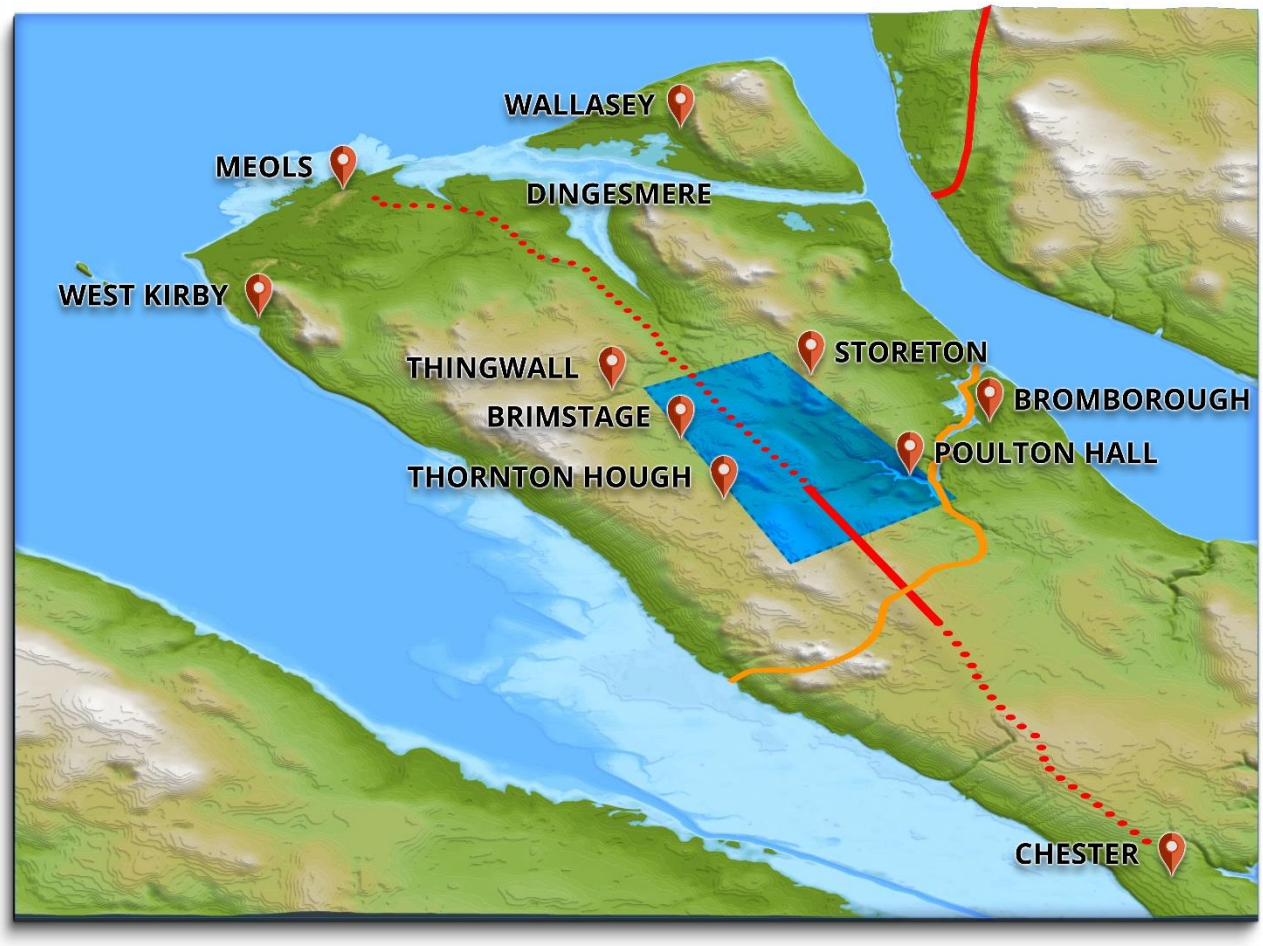
1) Olaf Guthfrithson's men sailed from Dublin to a location on the Wirral (directly or indirectly) that provided a suitable anchorage that was safe from both the potential effects of adverse weather and attack by the opposing Saxon force.
2) Guthfrithson's forces then travelled on foot from their moorings to a suitable campsite(s) to prepare for the forthcoming engagement with Athelstan.
3) One of the initial engagements between the opposing forces took place on or close to land occupied by Guthfrithson's army.
4) Once Athelstan's forces began to beat Guthfrithson and his allies into retreat, the retreating army would be in general, be attempting to move back towards their moorings to make good their escape.

One potential narrative proposed by those researching the battle at WA that would satisfy the above conditions is as follows:

Olaf Guthfrithson and his army sailed from Dublin to the Wirral and moored in Wallasey Pool. The pool itself and/or the surrounding marshland has been proposed by several researchers as being the Dingesmere, (D. Capener, P. Jenkins) with Poulton Hall proposed by some as being Brunanburh. The Dingesmere would have then provided a sheltered anchorage that could be defended by a skeleton crew while the main body of men make their way towards the battle site. The north of the Wirral peninsular itself providing some degree of security being as it is surrounded by water on three sides making it difficult for the Saxons to launch a surprise seaborne ambush on the moorings. In addition, the northern part of the Wirral was effectively a Hiberno-Scandinavian enclave. It was settled in common with much of the north west coast following the expulsion of the Dublin Vikings in 902. Therefore, the resident population would presumably be more likely to be sympathetic to Olaf Guthfrithson than to Athelstan. This would make the march between Wallasey Pool and Brunanburh safer for Guthfrithson and his army. Once at his chosen camp, Guthfrithson would feel

secure in the knowledge that as he made preparations to engage with the Saxon forces making their way onto the peninsular, he was not likely to face an attack from the rear by anyone loyal to Athelstan. As for the armies of Constantine and Owain, within this potential narrative, it is difficult for researchers to be certain as to whether they made their way south by sea, overland or a combination of the two. If they came via sea, they too could have moored in the Dingesmere, Wallasey Pool. If their journey south was solely an overland route, it may have taken them a considerable time to march from Strathclyde to south west Lancashire. It would seem logical that they would try to avoid entering the Wirral at the landward end for fear of being intercepted by Saxon forces at what is effectively a bottleneck. Therefore, it could be posited that a more likely route would be from the Ribble estuary via the Roman road from Hesketh Bank through south west Lancashire to Bank Hall where they could be ferried across the Mersey to Wallasey Pool to join their allies. One major consideration of a totally overland route south would be the logistics involved in keeping such a large number of men fed on the journey. There are many potential variations as to the logistics of getting large numbers of men to meet up in a coordinated fashion at an agreed location. Some such as Higham (1997) also suggest invading forces mooring in the Ribble. Variations on this raises the possibility of a short landward journey through west Lancashire to Bank Hall. Others favour the suggestion of all forces arriving by sea at the Wirral.

Within this general potential scenario, once the invading army was on the peninsula and engaged with Athelstan's forces but began to lose substantial numbers of men, they would presumably be forced back and eventually have to retreat back to their ships at the Dingesmere inlet. This is shown on the following illustration by Andy Quick: Model of proposed 10th century Wirral landscape based on LiDar data.
Yellow line: Assumed boundary of Hiberno Norse enclave
Red lines: probable /potential line of roman roads
Blue: area of interest covered by WA wider research



Whilst this, or a variation thereof appears to be a highly plausible scenario to its proponents, it is certain that whatever narrative is proposed by anyone researching the battle, there will always be some disagreement from others, academics and armchair historians alike. It is almost certain that we will never know the full details of the battle and the circumstances surrounding it.

In conclusion, if the Battle of Brunanburh did take place at a mid-Wirral location, the sites where WA have recovered their significant finds could well fit in to the above scenario or a variation on it as being the site of a potential Saxon camp close to the edge of the battle field as proposed by Dave Capener. The small but significant number of finds recovered by WA that may be linked to early medieval military camps such as gaming pieces together with potential battle related finds such as arrowheads could well fit in with the above narrative. WA themselves do not claim that their main find site where they have recovered their significant objects is actually the battle site. They do however believe it is not far from it. As such, a comprehensive programme of planned research will be required on such nearby land in order to progress the project to attempt to gather sufficient evidence in order that the battlefield can be definitively described.

References:

Capener, D., *Brunanburh and the Routes to Dingesmere* (Birkenhead, 2014)
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http://www.academia.edu

Higham, N.J. 1997 ‘The Context of Brunanburh’, in A. Rumble and A.D. Mills eds. *Places* and People: An Onomastic Miscellany in Memory of John McNeal Dodgson, Paul Watkins, Stamford.

Key Task B – Provide an initial general assessment of the finds and their significance, the methods of documentation and recording employed by WA. – Robert Philpott

The Wirral Archaeology claim

In 2019, Wirral Archaeology claimed that there are 'numerous artefacts discovered in certain fields which include hundreds of confirmed battle weaponry certified of 10th century origin' which support their case for identifying the site of the battle, and a flyer for a presentation at Heswall Hall on 17 October 2019 promises 'sensational proof of the famous battle and the search for evidence in Wirral'.

Wirral Archaeology has published through public lectures, private invitation-only displays of finds to invited guests, and social media (Facebook) claims to have found the site of a 'recycling camp after the battle', although it has been careful not to publicise the location of the findspots. https://liverpooluniversitypress.blog/2019/10/22/the-search-for-the-battle-of-brunanburh-is-over/.

The writer was invited to attend public and private displays of finds and talks by Wirral Archaeology at which other invited guests were shown material from the site and given presentations of reasoning for the claim. At these displays, other metal-detected material was on show which has not been examined here.

Wirral Archaeology has claimed that the finds assemblage demonstrates that the area over which the finds have been made was involved in the Battle of Brunanburh.

An objective assessment of the finds is required to scrutinise these claims.

The metal-detected finds are critical evidence to contribute towards the debate over the location of the battle site.

The current assessment

The current assessment report is intended to examine the key finds which form the basis of the battle site case, and test the reliability of the claim. The finds have been selected by Wirral Archaeology as a representative sample of the most significant items.

This assessment will characterise the material, assessing where possible the date and function of the finds, to examine the methodology of recovery, and also assess the reliability of claims that have been made regarding the finds.

The initial investigation of the finds was conducted by visual inspection only so interim identifications were made for items of ironwork which is notoriously difficult to identify in a heavily corroded state. A small sample of the potentially significant ironwork has been examined visually and by X-ray by Paul Sherman, revealing details of the internal form and structure of corroded objects. This has enabled the re-assignment of several objects. Similarly, some metalworking waste or melt has been subject to initial visual identification but supplemented during the course of the project by portable Xray fluorescence (pXRF) analysis undertaken by Paul Sherman. This technique analyses the elemental composition of objects,

providing a detailed breakdown of the elements present in metal objects, including metalworking waste. The interim identifications set out in the initial report have therefore been modified to take account of these analyses. That has also had an impact on the conclusions over the battle-related items.

It will also look at the character and quality of the documentation to assess WA's methodology on which the group is basing its claims.

Definition of Battlefield Archaeology

Battlefield Archaeology is defined by Historic England as 'the study of the physical context and remains of a battle in order to shed light on the battle and the time in which it took place. This branch of archaeology shares with general archaeology the use of methodical research, survey and analysis. However, its key distinction in terms of techniques is an emphasis on interdisciplinary study and a particular use of detailed, systematic metal-detecting to identify the precise location of individual items in order to form an understanding of patterns of distribution which can shed light on the events of the battle.' (HE 2017, 3).

The problem of identifying early battlefields is also recognised. 'Generally speaking, the earlier the period, the more difficult it is to find evidence associated with a historically documented battle.' (Sutherland and Holst 2005, 19). Historic England observes, for instance, 'Other than some prehistoric weaponry, secure and substantial archaeological evidence has yet to be retrieved from any English battlefield before the fifteenth century' (HE 2017, 5).

The most significant battlefields in England have been included on the Register of Historic Battlefields, a register maintained by Historic England. The criteria which a battlefield has to meet to merit inclusion are defined by Historic England and are determined by two principles: it must 'have been an engagement of national historic significance, and to be capable of secure location on the ground' (HE 2017, 9).

In the case of Brunanburh, its historical importance is clear, as Livingston and contributors to *The Battle of Brunanburh: A Casebook* demonstrate. It is the second element which is in question here. Can the battlefield be located on the ground?

Historic England places strong emphasis on systematic survey in the location of battlefields.

> 'The potential presence of features such as graves, structures, projectile scars on buildings, or assemblages of bullets, arrowheads and personal effects, creates archaeological significance as it may allow deployments and events to be reconstructed. It is now clear that the application of systematic survey techniques executed to professional standards offers the potential for major advances in the understanding of battle sites' (HE 2017, 11).

Similarly, battlefield archaeology specialists Dr Tim Sutherland and Dr Malin Holst note in the BAJR *Guide to Battlefield Archaeology*,

> 'Those who study battlefield archaeology need to use a multidisciplinary array of techniques in order to locate physical evidence of conflict. Each site will have its own idiosyncratic type of evidence depending upon what period is being represented. However, it is important to reiterate that the relevant

surveys and any resulting interpretation should always be undertaken by experts in the use of a particular type of analysis and thus interdisciplinary team work is often the best way to gain the greatest amount of information on these sites' (Sutherland and Holst 2005, 20).

The standards of recording and survey methodologies are well established for battlefield archaeology. Case studies employing these methods include the Towton project, and Edgehill (Historic England 2017, 11-12, fig. 10). A case study relevant to the Brunanburh project in terms of the methodology applied to an early medieval context has been the identification of the viking Great Army winter camp at Torksey (e.g. Hadley and Richards 2018). All these projects are available on-line.

The detailed plotting and recording of metal detector finds are emphasised by all recent studies into battlefield or conflict archaeology. It is also considered standard practice on settlement sites – thus at Cottam, the valuable contribution of controlled metal-detector survey, with the plotting of all finds, 'has been raised to a new level by this study' (Richards 2001). Significantly for the current project, one of the early surveys of this type, of the Viking winter camp at Torksey, has through careful map plotting of metal-detector finds before the widespread use of GPS been able to recover findspots to create a consistent digital record. The archaeologists observe that the site has suffered from removal of finds without recording or plotting with a consequent loss of information (Hadley and Richards 2018).

Key elements from these projects:

1. Metal-detecting is a crucial technique to identify finds distributions
2. Metal-detecting should be undertaken systematically, which presupposes a clearly defined overarching project design
3. All findspots are precisely and accurately recorded
4. Various techniques of survey and excavation (including geophysics, metal-detector survey, fieldwalking, selective excavation, topographical survey) are employed as appropriate to the battlefield
5. Multidisciplinary teams are essential, to ensure that appropriate expertise in various survey techniques is available
6. Relevant finds specialists examine the material to ensure that finds are correctly identified and accurate information is then logged systematically on a database

Given that the techniques for the study and location of battlefields are well established and available in the public domain via the internet, it is important to see how the WA finds measure up to the standard professional practice.

Material and accompanying WA documentation [This section redacted]
The existing documentation [This section redacted]
WA Numbering systems [This section redacted]

Databases/listings

Database 1

A database on Excel compiled by WA was supplied (Brunanburh Database.xls).
The data fields are as follows:

DATE FOUND	FIELD NUMBER	REFERENCE NUMBER	GPS REFERENCE	DESCRIPTION OF ARTEFACT	

This has a field for the WA number (here the 'Reference number' field).
Finds identification by WA [This section redacted]
Lack of findspot information [This section redacted]

General Character of the Finds Assemblage
Almost all the finds are metal, recovered by metal-detector. There is one fragment of pottery, one of ceramic roof tile, one of bone (not catalogued as it lacks a findspot and as it is from topsoil is almost certainly modern), and one of stone.

Summary of finds
The finds assemblage is made up of the accumulation of at least two millennia of human activity. This poses challenges in the identification and interpretation of such a wide chronological span of material.

A small quantity of Roman finds is present which may indicate the presence within the metal-detected area of a Romano-British rural settlement.

A small number of finds are diagnostically early medieval in date (period conventionally defined as AD 410-1066).

There are also some finds which can be assigned to the late medieval period (conventionally 1066-1540).

However, much of the material is not diagnostic of date as it lacks morphological or typological features which are distinctive of a particular period. There are many more finds which may cannot be dated more closely that to the early/late medieval period (AD 410-1540).

A significant proportion of finds is of post-medieval and modern date (*c*. 1540-1930).

The finds will be considered chronologically.

Romano-British finds (AD 43-410)
There is a small but significant group of Roman finds. Of certain Roman date is a finger-ring of Giraud Type 2g (**WA9996**).

Possible Roman finds include a mount (**WA9995**), and an unglazed earthenware sherd (**WA83b)**, though this is possibly post-medieval in date as potters at both periods used similar clays and firing methods, and as a body sherd with no obvious typological characteristics it is difficult to assign to one or other with any certainty. Other possible finds are a bronze/copper coin (**WA9978**). This is very worn and has lost much of its edge through corrosion, but traces of the design survive. A trace of an apparently nimbate figure is present on the obverse which would suggest a Byzantine piece. However, it could instead be a Roman *as* with a design of a shield resting on the straight line of the exergue. However, it lacks locational information.

A second coin may be of Roman date, in which case a radiate of late 3rd or *nummus* of 4th -century date but it is heavily cleaned and almost no detail survives (**WA1835**).

WA61 is a copper-alloy cylindrical ferrule with incised turned line decoration at the midpoint; one end open; other has near subrectangular hole; corrosion has appearance of old metal (possibly Roman).

Some of the ironwork may be of Roman date, as long-lived forms of iron objects persisted as type fossils. However, nothing has been identified which must be Romano-British as opposed to later in date.

The finds are likely to have derived from a Romano-British rural settlement of a kind which has been recognised across Cheshire and Merseyside (cf. Philpott 2019; North-west Regional Research Framework Roman period update: https://archaeologynorthwest.files.wordpress.com/2020/04/ch3-roman-period-revisions-july-2019.pdf). The small number of finds may suggest the settlement does not lie within the actively detected fields and this may be material dispersed as a manuring scatter. The precise location of the parent site is uncertain, though [locational data removed] would be a suitable candidate. The possible Romano-British rural settlement marked by a small number of certain and possible Roman finds is likely to be nearby rather than on this precise spot so it is peripheral to the settlement, as it lacks components of typical rural settlement finds assemblage such as brooches and other non-ferrous personal items. However, the lack of finds location data makes it difficult to determine whether there is a significant concentration of finds or a dispersed scatter.

Early medieval finds (410-1066)[1]
A small number of key finds are of early medieval date. They include the following:

A copper-alloy strapend (**WA21**) of Thomas Type B, with split-end and parallel-sided shafts, zoomorphic terminals and an average ratio of width to length of 1:4.5 (Thomas 2000, 99; fig. 3.21 E, from Carlisle Cathedral). Thomas dates this type to the mid 8th-11th century. The Excel database states ‘No GPS available at time’.

[1] Period dates are those defined by Historic England

WA9980 (temp no). A strapend/buckle plate, broken, copper alloy; two-part object, thin flat tapering narrow plate with single rivet, attached to flat recessed channel in tapering copper-alloy plate; end of channel marked by transverse ridge, beside which are several transverse raised parallel lines. Much iron corrosion of most of surface suggests buried in contact with iron object. Possibly Gabor Thomas strapend Type I (Thomas 2000, fig. 3.32), where the tapering flat plate sits in a recessed panel on the body of the strapend; the Wirral fragment is broken so lacks the broader end and is damaged at the terminal so no clear idea of terminal form; [label reads SJ32884 82223 F3 C/F/ 06 02 20]

Inscribed Lead Objects

A lead plaque or sheet with inscription (**WA93** on box, **WA94** on Excel database). The lead sheet has been folded but appears to have been repeatedly unfolded and folded recently, creating cracks and exposing the raw metal.

Mid to dark brown patination; parallel-sided lead sheet, with two incised border lines along two edges; a row of four bored holes (two now open, two closed over) with another bored hole below the first one; the holes are joined up by incised lines in a panel along the front of the object; this has a series of scratch marks, which appears to represent lettering, marked in multiple lines. At one end (over approximately quarter of the exposed surface) is a series of small holes has been stabbed into the sheet surface along the centre of the exposed face.

On the reverse, a very different, lighter patination colour, there are more scratched lines which appear to represent lettering. In Latin lettering ‘V I [or T] H’ standing on an incised line, along one edge, at 90° to the main axis of the panel; in the central panel marked by two incised lines, are letters ‘P I’.

Despite claims by Wirral archaeology that the sheet is rune inscribed, analysis of photographs by runic specialists Dr Andrea Freund and Dr Maja Bäckvall confirm that there are no discernible runes

The function of this object is difficult to determine. The drilled or punched holes suggest it served as an attachment, perhaps to a wooden or other organic item (possibly leather). The inscription, particularly if it is a personal name, may indicate mark of possession or ownership on a leather satchel or a wooden object, such as a box or casket. However, the object requires specialist examination.

It is worth noting that an inscribed lead plaque was found at Flixborough, also with holes for attachment (Brown and Okasha 2007).

WA54 A fragment of lead sheet, torn at right hand side, bears a possible incised runic letter ᛟ [oe] and a vertical crease (which could be mistaken for part of another rune). There is no sign of holes for suspension or mounting but it is incomplete. The incised letter and crease have the same lead corrosion products in the base of the letters as on the surface indicating that they are not modern.

There is no locational information recorded with this important find, other than that it was discovered in ‘Storeton’.

Gaming pieces/weights

There is a group of small lead, and in one case copper-alloy, objects of a type usually defined as gaming pieces or weights. The Wirral finds take several forms, plano-convex, hollow dome-shaped, conical and ‘bun-shaped’.

WA3c (from Storeton, location and field not recorded) which is bun-shaped; flat upper and lower, thick, rounded sides.

WA202 is also bun-shaped, with flat base, and rounded top and vertical sides.

WA9988 is shaped like small upturned vessel, hollow with domed top, with a thickened ridge around the rim and a triangular base. There are close parallels at Torksey (cf. Hadley and Richards 2018, fig. 3, Torksey_Other 215) (a Viking gaming piece), and PAS NLM-C71CDE.

Others are simple plano-convex (domed) lead items.

Some are conical in form (with hole in base: **WA9987**; parallel with PAS DENO-CACB0B) or of cylindrical form. All have close parallels in the Torksey collection or other early medieval sites.

WA36, gaming piece with a broad base and conical form; there are parallels at Torksey (Hadley and Richards 2016, 55, fig 26.)

WA69 is a copper-alloy example with a flat round base, and rounded conical side tapering to the top which consists of a thin projecting plate, with a rounded top; there is a hole in the centre of the base. around the centre of body are low ridges.

Some pieces may be trading weights and here the adherence to a standard Viking weight is a guide to their function as weights rather than gaming pieces, although of course there was no reason why such objects could not have served both functions.

The presence of gaming pieces in some quantities at Viking age temporary camps such as Aldwark and Torksey provides a secure date for the general types (e.g. Hadley and Richards 2016, fig. 26 Williams 2020). The attribution of an early medieval date of what are often quite poorly made objects is strongly reinforced by their concentration in some numbers at particular sites.

More likely a weight than a gaming piece is **WA8**. This is a subrectangular lead object, planar flat surfaces, rounded corners, cast, slight shrinkage on one surface; tapers gradually towards one end.

Probable Early Medieval Finds

There are a number of finds which are very likely to be of early medieval date. The ironwork is discussed separately as the presence of a number of objects of long-lived types requires detailed consideration.

Two spindle whorls (**WA56**, **WA57**) take the form and dimensions of Middle Saxon examples. A very similar example was excavated at Moreton, Wirral on a site occupied from the 8th to 11th century (Philpott 2015, 116, fig. 7.4, no 2).

Potentially important finds which may belong to the early medieval period include a lead object (**WA165**) resembling a sword pommel of Anglo-Scandinavian type (possibly Petersen Type R). This type of pattern of deep grooves is not found on these pommels. As a cast item in soft lead or lead alloy, it is not a finished article though a lead model for a sword pommel, of the late 5th or early 6th century, of uncertain provenance provides a general parallel for this type of object (Ager 2006).

WA165 on box (incorrect number on database)
Lead object, resembles sword pommel –rounded narrow top; oval in plan from base; plain zone on lower part towards base; upper part has an irregular pattern of deep grooved lines, most of them oblique but joining with a line at the edge at nearly right angles; lead is not the usual material for a sword pommel but this could be lead patron, for creating a mould for casting in copper-alloy. NB: No location information at all. A lead-alloy pommel of the 'cocked hat' type (c. AD 500 - 700) type has been recorded from Yorkshire (YORYM-BC43E1). This is one find which requires further examination by a specialist in Anglo-Scandinavian weaponry,

WA3d. Lead disc, flat, cut from sheet, so irregular edges; one face has small straight indentation. A possible weight.

Early Medieval Discussion

The location of the finds is crucial in order to determine whether there is a consistent location which indicates a concentration of finds. If this material, which appears to be medieval for the most part, is indeed in a restricted area the possibility that it presents one or more disturbed metalwork hoards should be considered. These collections of material, such as Nazeing, Essex (Morris 1983) or Flixborough (Evans and Loveluck 2009), consist of iron and other metalwork collected together for re-use, as well as tools for metalworking.

The diagnostic early medieval finds are in almost all cases unlocated. This is highly regrettable as it robs the project of the key locational data for the most important finds and severely diminishes their value. It undermines the claims of Wirral Archaeology to have found the battle site as the location of the chief finds which might contribute towards proof is unknown.

Finds of uncertain but possibly medieval date
A number of finds fall into this category. They include most of the iron objects.

The ironwork: bars, strips etc.
A substantial proportion of the finds are iron.
In consideration of the ironwork, a large assemblage of well-preserved material securely stratified from Anglo-Scandinavian deposits at 16-22 Coppergate, York, Ottaway (1992, 492-3) notes that evidence of ironworking comes from both smithing slag and what he calls ‘bar iron, blanks and scrap’. The 650 fragments are divided into strips and bars or plates according to width and thickness. Most were clearly unused (bar iron) although some were identified as objects in early stage of manufacture (blanks).

At Coppergate, Ottaway’s categories of strips and bars comprise 440 objects. Strips and bars have a max width to max length ratio of less than 4:1 and a relatively constant cross section size and form, although they may taper or narrow slightly.

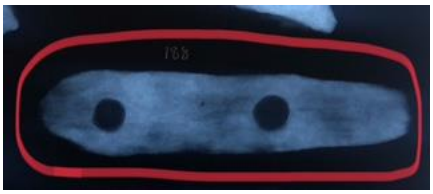
Bars/billets

The WA assemblage contains a number of finds that fit into Ottaway's category of bars and billets. They include several thick rectangular bars, or billets, of rectangular cross-section.

WA80. A billet, rectangular in plan and cross-section, measuring 53 x 19 x 14mm,

WA89. A similar billet, heavy rectangular in plan and cross-section
WA62. A larger billet of similar general rectangular form.
WA16. A flat bar, rectangular cross-section, rounded at one end, other cut off slightly obliquely
WA44. Rectangular in plan and section; heavy iron bar, slightly thicker at one end.
WA176. Bar, rectangular in cross section; subrectangular in plan, slightly rounded ends
WA53. Bar, square cross-section, rectangular and parallel-sided in plan, square ends
WA9968. Gently curved iron bar, one side rounded, other vertical; main surfaces flat and parallel plane (cf Goodall 2011, fig. 1.3, A14, though WA example is more regular)
WA20a. Very corroded so form indistinct. Initial visual inspection suggested that this might be an arrowhead, tang of uncertain profile, with main blade of trapezoidal profile, widening just about the slight shoulder and tapering to point though spalled now. However, Paul Sherman observes that the x-rays suggest that this is not an arrowhead but a highly corroded fragment of wrought iron bar. Confirmation may come from further physical investigation.
On the photograph below, 20a is on the left hand side, 20b is on the right hand side.

WA188. Visual inspection suggested this was a flat blade, with rounded tip and abrupt shoulders to missing central tang; it was thought to be a possible arrowhead though it lacks obvious ribs and is broadest just beyond shoulders; stripped down to metal. However, Paul Sherman notes that the X-ray demonstrated conclusively it is not an arrowhead but an object of flat section wrought iron with two hot punched holes along the centre of the body, the displaced metal created by punching the iron whilst hot causing the distortion of the grain within the iron.



WA186. Very corroded, bent and spalled tip, flat on one face, ribbed on other (shallow triangle in section) with marked shoulder to flattened irregular tang; possibly a blank but bent tip may indicate used; tang is flattened plano-convex in cross section. Paul Sherman notes that this is likely to be a highly corroded fragment of wrought iron bar with corrosion having followed the line of the grain formed by the silicate inclusions within the iron. Two distinct cracks can be seen in the "tang" and between the shoulder and centre of the "blade". He suggests physical investigation to confirm the identification as a wrought iron bar fragment.

Billets are present in small numbers – but indicate both metalworking (smithing) and preparation of iron for use. They are evidence of worked iron stored in preparation for working into an object on the smithing hearth. They are not closely datable but the regular size but thickness of some of these suggests to Paul Sherman (pers. comm.) they are steam pressed so later in date. Thick iron billets are not an efficient way to store iron due to the amount of heat required to work them.

Plates

There are several fragments of 'plates' following the definition established by Ottaway (1992, 501) as piece of iron '...which usually have a maximum thickness of 6mm or less and a ratio of maximum width to thickness greater than 4:1'. Although some plates had one or more straight sides, many were of irregular shape. Some plates were probably manufacturing offcuts, but it is likely that many others were scrap resulting from the breaking up of redundant objects. It should be stressed that a large proportion of the iron used by Anglo-Saxon smiths would have been recycled rather than freshly smelted.' ((2009b).

Nos 16-22 Coppergate also produced c. 200 objects defined as plates (Ottaway 2009b).

Fragments of plate

WA147 Flat plate, one rounded edge; oval in plan; other edges damaged and corroded so form uncertain

WA50 Flat plate, broadly rectangular but broken at either end; flat profile, active corrosion; broken fragment (WA suggest this is a sword blade fragment but there is no differential corrosion to show pattern welding, and no obvious cutting edge on either edge)

WA9960 Flat plate, slight point at one end; oblique cut off at other; no obvious cutting edge (too thick)

Bloomery iron

There are two masses of probable bloomery iron, partly worked but retaining obvious slag in the material.

WA9959 temp no. Iron mass with vesicular slag in the body of irregular iron mass; but no location or number so information lost.

WA 9958 temp no. Vesicular slag in mass of iron of corroded and uncertain form; also has no number

WA170 A single block of slag (CF/3 (170) recovered September 2019. This is described by Dr Peter Gethin of the Department of Archaeology, Classics and Egyptology, University of Liverpool as tap slag, probably of pre-industrial date.

Complete tools and other objects

There are a number of tools of types which are present at medieval archaeological sites (cf. Goodall 2011). At excavated sites, the tools are usually dated from their occurrence in securely dated contexts rather than from any inherently datable characteristics such as distinctive form or material. The Wirral material lacks any secure archaeological context as it has been removed from ploughsoil rather than excavated from securely stratified and dated contexts. However, spatial distribution may contribute towards the dating of the material. If undiagnostic ironwork (which is not obviously modern) is found in association with concentrations of dated early medieval metalwork, then it enhances the possibility that it too is early medieval in date. However, a fundamental problem with this assemblage is that almost all the datable early medieval metalwork is not located, so it is not possible to identify such concentrations.

As such it is not possible to narrow down the date to more closely than to the medieval period, and indeed some may be later than that, as many iron tools are type fossils, which were subject to little typological or technological change over time.

The overall concentration of tools is certainly unusual and indicates a concentration of craft activities such as metal or other craft working.

There are a number of awls and/or punches – slender iron tools with a tang for a wooden handle and a working end as *;

A tanged tool of diamond/square shaped cross-section, narrow wedge-like tip; and tang at 41mm against blade of 56mm; tang is corroded but apparently circular cross section; so probably a tool – either a tanged punch or an awl. Cf. Goodall 2011

WA27 is an awl, a narrow tool, square/rectangular section, pointed at one end, other obliquely cut off, no distinct break from handle to shank; very corroded. (Cf. Goodall 2011, E24-E27, E29-37)

WA181 is a probable awl; approximate square (diamond) section narrow shank, with rounded 'point'; shank tapers gradually into narrower tang of sub-square form.

WA9 Possible awl or punch, one tip bent over, tapers to broadest in middle then narrows to rounded tip; corrosion and metal stripped back so original form uncertain; section is damaged and uncertain.
1
There is a group of tanged punches with square-section shanks and short tangs (e.g. **WA9969**, **WA9970**, **WA9989**; WA195 short tang; WA175).

WA175 Tapering shank to small wedge terminal; subsquare cross-section; abrupt shoulders to short tang of sub-square section

WA117 Tapering shank to rounded point; square cross-section; abrupt shoulder to short square section and tapering tang; tanged punch

WA66 Narrow square-sectioned; tapers to point at either end; small awl or tanged punch

WA164 Long punch, tapering conical shank to slightly blunt tip; gentle shoulders to square-sectioned tapering tang; probably large tanged punch

WA9970 Long iron object, sub-square section to shank, tapers to rounded point at one end (tang?), and to a thicker rounded end at other; possible punch

There is a group of punches of similar type and length with burred heads (**WA194, WA195, WA173a**).

WA173a Long narrow punch, square section, tapers to sharp point; head is cut off square, no burring obvious

WA194 Long narrow punch with wedge-shaped tip tapering to subsquare shank, and expanded burred head, oval in plan

WA195 Long narrow punch, square shank, widens just before rounded point; head is burred and roughly oval

WA9962 Punch Long slender shank of rough rectangular-sectioned cross section, swells out to broader ?burred head; other end broadens slightly near end then tapers into fine point

WA9967 Square sectioned shank; lightly domed expanded head, tapers to damaged but slightly wedge end terminal; punch Cf Goodall 2011, A60

WA9966 Square-sectioned shank; flattened expanded head (subrectangular in plan) tapers to slight wedge-point; punch

WA9971 Square shallow domed head, gentle shoulders, to square-sectioned shank; broken; Goodall 2011, C30-33 punch; size and spread of head suggest punch

WA9969 Long iron object, circular-sectioned shank; L-shaped head with slight project from terminal to one side only; other end is rounded, possible punch with head bent over

Awl/punch
WA9965 Square-sectioned shank, ; square end at broader end; pointed at long narrowing tapered end; punch/awl; no sign of expanded head

WA167 Wedge, has possible medieval parallels Burred rectangular head, wedge-shaped body fans out towards cutting edge blade; cutting edge damaged (Cf Goodall 2011, C1, stone mason's wedge).

Woodworker's wedge, parallel side and narrower but burred head Burred and expanded rectangular head, parallel sided body, wedge-shaped in profile; to rounded cutting edge (WA199a – NB this is the correct item for WA199 entry on Excel database; duplicated) (cf. Goodall 2011, B131)

An iron wedge (WA temp no **9963**) for a tool handle has later medieval parallels (e.g. identical to Goodall 2011, 27, C15) but there is no reason why a similar object is exclusively of that date. Given its size (53 x 43mm) it would have served to secure a large handle such as a pickaxe or heavy hammer.

WA85 is an uncertain tool; one flattened end, subrectangular in profile; main shank tapers to narrow broken wedge point; cross section subrectangular; tapers in all planes, slight curve near broken end.

Tongs?
WA9964 Rectangular flattened shank; rounded at one narrower terminal; broadens at other with narrow angled projection no sign of a pivot hole but broken; probably one arm of pair of light tongs (cf. Goodall 2011, A22).

Anvils
WA166: An L-shaped object with short oval shank, attached to a long cross bar of L-shaped profile, creating a shelf-like edge. No parallels found, but shank would fit into hole in anvil or stump.

WA49 A probable small anvil, T-shaped, with one end as wedge, other rounded; joined to oval shank with narrower tapering rounded terminal; probably a small anvil.

Knives

Goodall (2011, 108) observes of medieval knives 'many of the whittle tang knife blade forms are in fact merely continuations of pre-Conquest forms'. This makes dating difficult in the absence of the stratigraphic control evident at sites such as 16-22 Coppergate, York (Ottaway 1992). The following are therefore not closely datable but are consistent with medieval forms.

There are four knives and one probable knife present.

WA19 Fragment of scale tang, shoulder and broad blade, distinct triangular cross-section; straight back (no shoulder) but concave curve on tang; choil is abrupt at approx 45°, but the end of the blade broken so its overall form is uncertain; Cf Goodall 2011 Type O, for the knife form but it could be larger cleaver as it has a broad blade with a triangular section, and a straight back to a broad scale tang (no sign of rivet holes survive); (Goodall 2011, 298, nos J38, J39, though less of bevel on back).

WA79 Knife blade, broad tapering blade, with hint of shoulder to missing tang; tip also broken slight narrowing towards cutting edge

WA88 Knife, whittle tang, abrupt shoulder, straight back; cutting edge appears fairly straight but damaged by corrosion; triangular blade profile; Ottaway 1992 Type C1

WA78 Knife (Ottaway 1992 Type C1, cf no 2824, fig. 230); this appears to be an early medieval form, but the corrosion is so intense that the profile of the blade is not clear, and the cutting edge is not as evident as it should be. Straight back, slight abrupt angle at shoulder to tapering tang; blade has pronounced choil, and edge is curved to broken tip; heavy corrosion means blade is almost as thick as back, not tapered

WA48 Possible knife, but very corroded. Thick metal with lozenge cross-section and abrupt shoulder/choil to tang; tip at both ends broken so original form uncertain.

Weapons: swords, arrowheads, spearheads

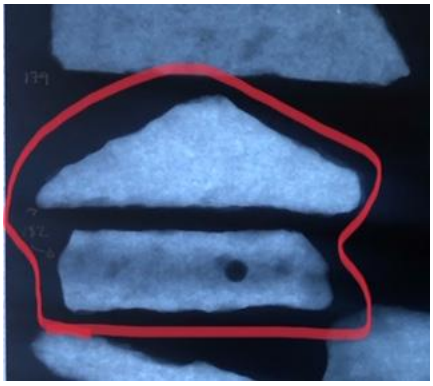
Sword pommels and blades

Several objects have been claimed as potential sword pommels or sword blade fragments. None appear to have characteristics which would be appropriate for a sword pommel and the identification cannot be regarded as sound. No sword blade fragments have been identified.

WA1399. A iron triangle heavily corroded, no sign of decoration - flat sides, further examination shows this is not a sword pommel.

WA182a Superficially this resembles an iron sword pommel of Petersen Type I/H in front view but narrower (WA182a). It is heavily corroded and has been reduced to bare metal. We were initially told by WA that the triangular pommel was found attached to a grooved parallel-sided strip of iron with an iron rivet, which formed the lower part of the pommel (**WA182b**). This potentially important find has incorrect information on the Excel database. It has lost much of the surface through cracking and removal of corrosion. However, after X-ray of this piece, Paul Sherman observes that there is no evidence of a tang/pommel junction in the centre of the base. He notes that 'all the pommels I have examined that have no tang attached still show some vestige of it within the pommel base. (P. Sherman pers. comm.).

WA182b Paul Sherman notes: Enquiries to WA reveal that WA182a and b were not found together as first mentioned but recovered approx. 1 metre apart by the metal detectorist. He apparently told the rest of the group that the two were associated as the second piece was the mount for the pommel. This looks unlikely and the x-ray confirms this.



WA9956. Parallel-sided, thin lentoid profile with cutting edge on both sides; damaged and broken at either end. Prior to X-ray, on visual inspection only this was considered to be possibly part of a sword blade (found in the bottom of a box with no label or other information at all). However, after X-ray Paul Sherman notes that the lack of the expected tapering of the 'blade', a cross-section which is plano-convex rather than the lozenge-shaped or slightly convex profile on both sides as well as the fact that there is no evidence of the fullering along the blade centre line, all argue against the interpretation as a sword blade. Further, he observes that the ' X-ray of this object shows it to have a uniform longitudinal grain structure with no sign of any welding having been carried out. This is commensurate with it being forged from a single billet. It would be reasonable to expect a Viking sword blade to be constructed from several separate pieces forge welded together in strip welded if not pattern-welded construction. Although mono steel construction was possible as metalworking techniques improved, the difficulties in producing large single pieces of metal meant that building up a sword billet from multiple smaller sections and forge welding them together would be the more common method of construction during the early medieval period.

WA1853. Iron object of triangular form, thin in cross section and curved in one plane. This is cast iron, and part of a larger cylindrical item such as a pipe. This is definitely not a sword pommel.

Arrowheads and other projectile points

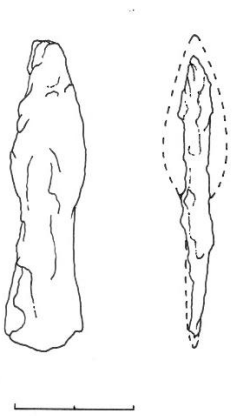
Several arrowheads have been identified in the assemblage. There are no certain socketed examples, although one unusual barbed example (**WA199**) may have been socketed but it is too damaged and corroded to tell. All those in sufficiently good state of preservation have a visible tang. As far as it is possible to tell with heavy corrosion, most appear to have triangular-shaped heads with tangs, of Jessop's Type T3.

Certain/highly probable arrowheads are **WA20b, 2415 and 42**

WA20b. Very corroded but appears to be arrowhead, tanged, of square tanged cross-section, blade widens above slight shoulder and tapers to point, corrosion spalled on one side. Paul Sherman notes that the Xray suggests this is an arrowhead but very little metal survives within the corrosion products and it would probably disintegrate if subjected to physical investigation. 20b is on the right hand side of the photo below.

WA2415. Small triangular head with flattish profile, clear cutting edges to blade, narrowing to long tang with abrupt step. Well preserved and a certain arrowhead.

WA42. [not seen by the writer]. Paul Sherman has identified this as a tanged arrowhead, with a reconstruction drawing by Robert Travis based on the original appearance and appearance after removal of the corrosion products.



WA42

Possible arrowheads

Several finds are recorded as ‘possible arrowheads’ e.g. **WA4,** where very corroded objects have signs of a tang, shoulder and blade that broadens out above the shoulder and tapers towards a narrowing point, though often the tang and point are damaged. Heavy corrosion usually robs these of their original integrity and form so the identification is uncertain. However, there are sufficient complete examples to support the interpretation of others as probable examples. The X-rays of selected pieces towards the end of the project has enabled the more precise identification of some items. These have been reallocated to the most likely category.

Possible examples include the following:

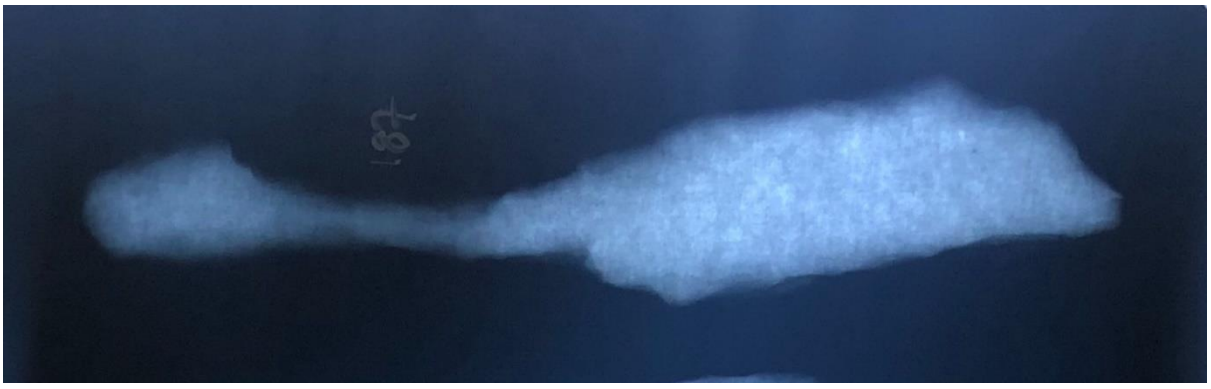
WA4. Part of the tang survives, broadening out to the blade after abrupt shoulder, then tapers towards a rounded point; corrosion means most of one side is missing.

WA14. Very corroded but takes the form of a triangular-section bladed arrowhead with lozenge in plan; tang of uncertain section.

WA77. Diamond-shaped section, widens at one end but spalled; probable lozenge section; other end has square section narrower tang but broadens at terminal - unclear if corrosion or integral. Paul Sherman notes that the Xray indicates a possible highly corroded arrowhead similar to WA2415, extant metal core is exceedingly thin at the ‘tang’ end and unlikely to survive further investigation without disintegrating.

WA9977. Described as ‘Possible arrowhead fragment’. Fragment of iron object, lozenge section to short tang, part only of blade of arrowhead survives; the cross-section of the blade shows a central rib narrowing to either edge. Tanged arrowhead.

WA187. Possible arrowhead but much spalling of corrosion so the form is uncertain. Possible tang, flat and spalled, sharp shoulders to blade with possible central rib. Paul Sherman suggests this is more likely a highly corroded fragment of wrought iron bar with corrosion having followed grain formed by silicate inclusions.



Discussion

In a discussion of early medieval arrowheads Ottaway (2009a, 123) observes, 'The form of the arrowhead in Early and Middle Anglo-Saxon England is not well understood as very few have been found, although socketed leaf-shaped blades have been recorded in early Anglo-Saxon contexts…. The tanged form appears to be by far the most common in the Late Anglo-Saxon / Anglo-Scandinavian period'. Ottaway's study of the16-22 Coppergate examples in York shows the tang is a heavily dominant form (Ottaway 1992, 710–11). Jessop notes that tanged arrowheads, of this Types T1, T2, T3 are 'predominantly from contexts dating from the 9th-10th centuries. Their apparent absence from later deposits may indicate that they were soon replaced when socketed forms became widespread' (1996, 193).

There is one well-preserved arrowhead with a small triangular head and stepped tang (SF2415). The latter feature, with a stepped tang, narrowing sharply, conforms to Jessop's T1 and is found on Anglo-Scandinavian arrowheads, such as examples from 16-22 Coppergate, York (Ottaway 1992, 710-715, e.g. nos 3905, 3913). However, the triangular shaped head is generally characteristic of a later type Jessop's T3, which occurs without the stepped tang. Without the ability to search more extensively in the literature at present, it is not possible to test the assumption that this is an Anglo-Scandinavian type of hybrid form. Ottaway notes, for example, that a number of arrowheads from Coppergate do not take the common leaf-shaped form but are of 'related, but rather different, forms' (1992, 711); at the same site he suggests that individual unparalleled examples 'represent distinctive local variants of the leaf-shaped forms', so the presence of individual items which do not conform to standard typologies comes as no surprise.
Overall, the presence of tanged arrowheads in the assemblage is consistent with late Anglo-Saxon/Anglo-Scandinavian weaponry. However, the forms are more difficult to parallel in most cases. In part this is due to their condition, with deep corrosion products on many, requiring X-ray to determine the shape of the object underneath the corrosion. The lack of visible sockets amongst the items seen so far appears to be consistent across the assemblage, with the proviso that X-rays may show more detail within the corrosion. The majority of the arrowheads conform to the triangular head and tanged form of Jessop's Type T3 (1996, 193-195, fig. 1). Jessop observes that tanged arrowheads, of his Type T1, T2 and T3, 'are predominantly from contexts dating from the 9th-10th centuries' and were replaced by socketed forms. However, his dating is ambiguous as his catalogue for T3 gives a date range of 12th-13th century, stating it is a development of T2, which is dated 11th-12th century (Jessop 1996, 195). The apparent contradiction may be the result of a dearth of datable contexts overall.

Spearheads

Viking-age spearheads of Scandinavian origin or type are almost invariably socketed (e.g. Petersen 1940). There appears to be nothing in the assemblage seen so far which can be unequivocally identified as a spearhead. There are a number of heavy blanks of leaf or 'triangular' form which are unfinished and the final shape is uncertain. However, it is likely that the tanged form is preserved, unless a socket was brazed on, though this seems an unnecessarily complicated manufacturing process (e.g. Jessop 1997; Jessop 1996, Type 3). As such these are unlikely to be spearhead blanks.

Discussion

The number of items which can be securely identified as early medieval military weaponry is small. Xray analysis has reduced considerably the number initially suspected as weapons, demonstrating the value of the

technique for attribution of date and function to iron objects, but also illustrating the dangers of relying on visual identification only.

Possible blanks or tools

Objects identified in the WA assemblage as blanks are defined as roughly shaped objects, not worked into the finished object, following Ottaway (1992, 493).

A number of examples of a similar type of iron object are present. They have blades tapering towards a point with an abrupt shoulder to a short tang; they have a thick subrectangular cross-section and no sign of a central rib or cutting edges characteristic of the finished items. The similarity of shape suggests they were made to a consistent pattern. Superficially they resemble projectile points, such as arrowheads, with the tapering point and tang, and they have been interpreted as arrowhead blanks. However, this interpretation must be regarded as unlikely since the size of these objects, given the mass of metal in the blade, is excessive for the normal range of arrowheads in the early medieval period. Instead, they resemble in form the medieval reamer, a tool for enlarging holes bored in wood. Although these are normally square or nearly so in cross-section, their appearance is closely similar to some of the medieval examples (cf. Goodall 2011, 26, fig. 3.8, nos B101-B112), and they may be tentatively assigned to that group as possible blanks.

It is conceivable that tanged blanks were intended to have sockets brazed on. Jessop observes for the addition of thin strips of metal for barbs. However, he also notes that the socket of arrowhead was formed 'by flattening on end of a bar of iron and then rolling it over' (1997, 2). The 'opposite end could then be shaped into sharp cutting edges or enhanced by the addition of flat strips of metal, which were fire-welded or braized into place and sharpened to form barbs' (Jessop 1997, 2).

WA200 This appears to be a blank, with heavy rectangular section blade, tapering blade to point; narrow blade broadest at abrupt shoulders; tang is short, tapering and roughly circular in section; cross section in subrectangular; thickest at shoulder, so unfinished blank for arrowhead, or more likely reamer.

WA51 Narrow blade, flat rectangular shaped blank; point not formed, shoulders narrow to very short tang; possibly arrowhead blank or more likely reamer.

WA59 Object tapers gradually to a point at one end; at other abrupt shoulder to a potential tang; rectangular section, flat and uniform thickness not so a finished object.

WA9976 (temp no) Leaf-shaped arrowhead blank; trapezoidal cross section; no shoulders; no sign of socket; for overall general shape, see Ottaway 1992, 713, SF3923

WA45 Heavy blank for possible projectile point or more likely reamer

WA48 A large heavy object, tanged – a blank for large arrowhead or more likely reamer

WA9957 Tang, abrupt shoulders to a broad then tapering to narrowing rounded point; thick rectangular cross-section; blank for tool or projectile head

WA190 has a tapering blade, very heavy so blank? Traces of edge on two sides and terminates in point; shoulders narrow to a vestigial tang; incomplete or unfinished; possibly arrowhead blank or more likely tool (reamer).

Later medieval finds (1066-1540)

There is a significant group of later medieval finds. Key finds are as follows:

Medieval Vessels

There are two examples of fragments from large copper alloy vessels WA99 from Storeton and WA31b both rims, of probably medieval cast cauldron type vessels.

WA31b One cast copper-alloy vessel, diameter at rim c. 200mm, flaring rim thickens just below top of rim probably from vessel of type found at Meols (Egan 2007, 168). Egan notes the most common forms are the ‘ubiquitous tripod-cauldron cooking vessel (with flaring rim) and tripod serving ewer’. A much thicker vessel (WA99, Storeton, no findspot) with a tapering slightly everted rim may be a fragment of medieval or post-medieval mortar (cf Butlin *et al.* 2009).

WA32 is a fragment of flaring rim of a lead-alloy (lead-tin?) vessel, probably of medieval date.

WA12 {check} A slightly curved copper-alloy sheet with rim edge, may be a thin vessel rim but is not closely datable as insufficient survives of the form to be diagnostic.

WA17 is possibly part of an iron vessel, with thick sheet or plate, curving in two directions, although it could be a modern object.

Roof tile

WA1326 is a fragment of curved roof tile or imbrex, in a pale cream-coloured clay with a rough inner surface, possibly due to resting on vegetable matter, and pale outer unglazed surface. However, the edge, which is vertical and straight, and the uniform curve of the piece in one plane only, indicates it is a roof tile, not as first thought crucible. It is too large for a crucible and the grey surface may be burning rather than high-temperature firing – there is no vitrification for instance.

The pale-firing clay suggests a source in the coal measures. Both Chester and Wirral received some pottery from the Ewloe kilns on the coal measures of Flintshire across the river Dee, which were in operation in the late medieval period, with a *floruit* of the 14th-15th century (Harrison and Davey 1977).

Objects of uncertain date and function

WA174 possible chisel Broader sharp blade; narrowing shank towards handle; ridged along edges of both faces of the blade; handle oval solid tang and broken; chisel-like; no parallel in Goodall 2011 or Ottaway 1992.

WA169 Long gradually tapering shank, square sectioned, widest just before one abrupt pyramidal terminal; other end tapers to narrow rounded wedge. Possibly a rake tooth cf Goodall 2011, 90-91, F34, [could be medieval]

WA161 Asymmetrical T-shaped object, one arm of T narrower than other; shank is trapezoidal in section; rounded narrower side, broader flat size; section of T subsquare; looks like cast iron not wrought. PS note: original thought 'jeweller's anvil but looking at shank in section perhaps a cotter or lynch pin'.

WA70 A copper-alloy object which could be a Roman mount or a post-medieval drawer handle; the heavy corrosion might argue for an earlier date but these are very common objects from the 18th-century onwards, in neo-classical furniture.

WA189 Heavily corroded and spalled iron object, shallow triangle in profile on blade, rib on one side, with slight narrowing to possible tang. Paul Sherman notes that the Xray shows this to be an irregular-shaped highly corroded wrought iron fragment, and probably not an arrowhead.

Lead-alloy object

WA46 described on bag as 'lead mould votive axe mould'. This seems very unlikely for two reasons. Lead or lead-alloy is not a material used for moulds due to its very low melting point (327°C). It would melt itself before any material cast in the mould melted. The only material which could be cast in such a low temperature mould is wax, but a clay mould would be easier to create. Furthermore, the internal surface is very irregular and given the softness of lead would easily be smoothed if it were a mould.

Its function and date are uncertain. Possible interpretations are: a Roman lead lamp holder although it does not have the classic form of these objects. It could be a lead inset into stone to embed an iron object but it is not easy to identify the type of object if so. The function is uncertain but the WA interpretation as a mould is highly unlikely.

Whetstone?

WA71 is a possible whetstone. It is a curiously-shaped piece of fine grey sandstone, with a groove which might indicate use as a sharpening tool. It is described as tuyère but there is no sign of burning or heating and it was never a complete tube – a sandstone pebble of fine micaceous grey sandstone, possibly of glacial origin, modified with two grooves perhaps to use as whetstone for sharpening. There is no way of dating it.

WA's suggestion as a tuyère lacks conviction –. tuyères were invariably ceramic in early iron-smelting furnaces or bloomeries (Cf. Dungworth 2015, 20, fig. 11), or, in the post-medieval period, of metal and show distinct signs of heating, crucial to the interpretation of this as part of the high-temperature process of which there is no sign here. In addition, it is clear this piece has never formed a complete tube as the edges are worn and rounded not broken.

Metal-working

There is some good evidence for metalworking. This not only iron working but also non-ferrous metals. There are a number of iron billets. The large number of metal blanks implies metal processing. Also copper-alloy and lead-alloy melt is present in small quantities. One fragment of zinc-aluminium melt (WA15) is modern as aluminium was not industrially produced until 1856.

Galena and part processed lead

Cf Dungworth 2015, 50, fig. 43 shows lead slag very similar to this piece **WA183 [recte 6987]**. It has an irregular surface with small fragments of angular crystalline white stone embedded in the matrix, indicating part-processed galena. Lead ore – galena part-smelted (WA temp no 6987) (this was photographed from box WA183 but this appears to be a duplicate number) (Paul Sherman: XRF indicates this has a high lead content so the material has been smelted, though the presence of angular crystalline rock fragments in the surface may indicate that the material had been in contact with a surface where the parent rock ore was present.

Lead-alloy melt includes WA52, a long run of metal, and WA207, an irregular lump of lead with stone particles, which may be ore fragments (XRF14).

WA6985 is another irregular fragment of lead with large fragments of charcoal in matrix which appears to be smelted metal with fragments of the fuel still attached.

Lead-tin/tin-lead alloys (pewter and other alloys)

WA97 One irregular fragment, with one fairly smooth surface, the other has an irregular projection, and around it areas of parallel-grooved tool marks. While the WA97 finds sheet states ‘3 machines indicate it is silver’; Note by P. Sherman: WA97 is not silver. XRF shows it is an alloy of tin and lead (Sn 53%, Pb 28%).

WA43a One piece is lead-tin alloy melt, with a pitted surface, flat on one side of pooled metal, convex sides and flat on other; solidified on a rough but flat surface. Analysis by pXRF carried out by P. Sherman indicates Pb 65%, Sn 30%.

Several lead-tin melt fragments have solidified on a flat smooth surface, e.g. **WA11, WA33**, while **WA15** has solidified on a rough uneven surface but is the same type of pooled flat metal with a plano-convex profile.

WA157 Oval flat fragment of object, possibly vessel such as a plate or dish with irregular broken edges but flat and smooth on both faces

The presence of what appears to be newly smelted lead might argue against a connection between this material and the battle scenario. It implies a settled environment for acquisition of lead ore rather than that of a short-lived, spontaneous battle camp. It is conceivable that the non-ferrous metalworking is associated with the Roman finds but there are too few to be convincing so far.
The nearest source of raw lead is Flintshire across the Dee Estuary from Wirral, an ore deposit which was widely exploited by the Romans (e.g. O’Leary *et al*. 1989).

The material is not datable on typological or formal grounds.

Copper-alloy melt
Another element is copper-alloy melt which is present in small quantities. This is a characteristic waste-product of copper-alloy/bronze working. This material consists of small rounded solidified blobs of copper alloy, formless and showing no sign of solidifying on a surface (WA159, WA185, WA119, WA117a, WA92); have these spills solidified in water to lack contact with a surface, or air cooled as spills during pouring?

This material is inherently difficult to date without diagnostic criteria or a securely stratified and dated context.

Iron smelting and smithing
WA9958, 9959 appear to be wrought iron fragments. WA9958 is Irregular mass of iron, heavy corrosion on surface but small exposed part of metal shows vesicular slag in body
WA9959 is an Irregular mass of iron - with irregular fragments of vesicular slag within body, suggesting roughly worked bloomery iron.

There are only a few iron smelting slag fragments amongst the assemblage thus far. One block of tap slag is present, of pre-industrial date (Dr P. Gethin pers. comm.).

There is little iron smithing slag amongst the sample assemblage. This may be a feature of the metal-detecting collection strategy which does not collect such unappealing material, or it could be an omission from this selection of the assemblage. It is not visually striking and could easily be ignored.

Discussion
The copper-alloy waste is not closely datable. Similar waste can be found on Romano-British rural sites (copper alloy melt (there also with ceramic crucibles from an excavated site) at Irby, Wirral: Philpott and Adams 2010, 149; ceramic crucibles at Court Farm, Halewood), so could belong to other periods. The presence of a possible Romano-British pottery sherd and a ring, along with reports of several Roman coins from [locational data removed] suggests some of the undatable or undiagnostic items may derive from a Romano-British rural settlement. Such a site might be spatially distinct from the mass of other material but isolating such concentrations can only be achieved if precise and accurate GPS plots are available for all finds.

Post-medieval finds (1540-1900)

There is a considerable amount of post-medieval material amongst the portion of the finds assemblage examined so far. Some of these are personal items which were easily lost in working or walking in the fields, such as the buttons; a group of at least five toy guns suggests the fields served as a children's playground. Others are related to agricultural activities, either items from horse harness, or probably items from machinery.

Horse harness mounts (bridle bosses)
One common category of post-medieval find is horse harness bosses or mounts. These are large, often circular mounts, often with a boss in the centre and lugs on the reverse for attachment to leather straps. There are some slight similarities to Roman harness mounts but the post-medieval examples follow patterns identified widely across the country amongst finds reported to the PAS. They are obvious finds for ploughed fields as they were prime candidates for loss during agricultural activities such as ploughing, harrowing or harvesting when they would easily become detached undetected from the harness. Copper-alloy examples are WA9995, WA2, WA22, WA1,

In the 18th century bridle bosses were usually plain, decorated only with concentric grooves; they can also be identified by the presence of two projecting tabs for the rivets (Noël Hume 1969, 240).

Of uncertain, although probably post-medieval date, are some very neatly made metal items with few distinguishing features such as a copper-alloy ring (WA103) or WA83a. The latter was tentatively identified

by finders as a bracelet in copper alloy but is too evenly manufactured, and appears to be a drawn copper-alloy square-sectioned rod. These lack the tool marks which might denote hand-crafted objects and they are likely to be 18th century or later in date.

Personal Items

Other post-medieval finds include single finds of a range of items.

WA3a. Lead cast flat disc with two small holes, rounded edge; two holes, each has an area of wear from hole to edge of discs. It could be a lead(-alloy?) button of post-medieval date. However, there are numerous finds of lead discs with two holes (though usually in later period cast with a recessed centre) which functioned as weights for curtains and dresses, when they were known as ‘penny weights’ (cf. Bailey 2016, 83). The PAS database has many examples, including PUBLIC-596A2D from Osbaston, Leicestershire.

WA35 Leather workers' palm guards are discussed in an article in Gordon Bailey's 'Detector Finds 2', 1993, pages 64-5. Dating of these artefacts is very difficult; the earliest examples seem to date from the 17th century, although they may have been in use right through to the 20th century (Bailey, 1993, page 64).

WA81 is a plain tombac button. Probably of 18th-19th-century date. Plain undecorated disc externally; underside has conical central one-piece element, for attachment (missing)

WA9997 a knop from a post-medieval tobacco jar or other vessel. It is a typical lid handle for an item such as an 18th-century tobacco jar although similar lid handles are found on other types of containers of the same date. Despite a superficial resemblance to medieval and early post-medieval mounts, these are detached post-medieval handles. The late date is supported by the coat of black lacquer still adhering to the knop.

Decorative mounts/finial

Any large group of metal-detector finds will produce finds which are difficult to identify precisely. Several finds here are difficult to parallel as such items were often bespoke 'one-off' objects for particular settings. Suggestions of date or function have to rely on features such as the general type, decorative features or the distinctive use of materials.

Finds in this category include the ovoid spiral decorated or wrythen-knop terminal or finial (WA40). The WA Database has 'BRONZE FINIAL/DAGGER CAP'. But the WA piece is lead-tin rather than bronze and no dagger finials take this form. Several types of object have this wrythen decoration (spiral grooves). The closest objects in form are knops from spoons and pins) but they are usually smaller. A very similar decorative design, and material, was employed for a walking stick handle recorded by the PAS. The material is lead tin. The main other types of artefact with wrythen decoration are early medieval pins and late medieval spoon knops. Lead-tin was not widely used for pins which form a main category of early medieval find and the WA example is much larger than typical pin heads. It also retains traces of scarlet paint in the grooves, suggesting it is a post-medieval item. This could be furniture decoration or even part of a drop handle. It is broken so it is not easy to determine its original form and function. However, a spiral decorated cane top is very similar in material and decoration and might suggest a broadly analogous date.

Zoomorphic figure

WA9954, WA9955: Another find of a type difficult to parallel is represented by two fragments of a large lead-alloy (lead-tin?) cast zoomorphic figure (WA9954). PAS describes this as 'A fragment of a cast lead-alloy figurine of possible Roman or Medieval date. It is possibly zoomorphic in design, possibly representing a pig or boar's head. It is d-shaped in section and the reverse is slightly hollow.' (PAS LVPL-5C3E78).

However, a detached and bent foot (WA9955 temp no) can be seen to join the first piece (WA9954; PAS LVPL-5C30A6). The form of the foot allows the decisive interpretation as a lion or similar creature, demonstrating that this item represents the hind-quarters of a large animal rather than a boar's head. The large size means that it is more likely to be part of an object such as an architectural crest or rather than a figurine, livery badge or mount. The lion appears on many medieval and later heraldic devices, and this may have formed part of a large heraldic crest (cf. crest on Church Street, Ormskirk house belonging to Stanley family SANS CHANGER though not a lion). It may be post-medieval rather than medieval.

Building materials

WA10 A square lead object is a setting for an iron masonry cramp –which here takes the form of a small square box-like element in lead where molten lead was poured into a hole in masonry to fasten a metal element such as a rod, railing or cramp. It is likely to be medieval or later in date and is consistent with architectural construction, so perhaps emanated from the nearby Poulton Hall. Parallels are with the lead bedding for a masonry cramp (e.g. PAS NLM-00FDD7, from Bigby, Lincolnshire and considered to date from 1600-1800).

Toys

There is a group of at least five toy guns. They take two main types: the curved and deeply grooved handles of petronels (WA39 and WA9981; possibly also WA193), and the smaller and narrower decorated handles of pistols (WA156, WA68). These are discussed and illustrated by Forsyth and Egan (2005, 90-96).

WA156 cast decoration of handle of toy gun fragment with a close parallel on PAS website from Yorkshire (PAS YORYM-F6184A). WA68 is the handle for a toy gun or pistol (cf. Forsyth and Egan 2005, 90-96; cf, PAS example YORYM-AE136E).

Two toy guns are represented by lead-alloy handles of petronels (**WA39, WA9981**), of a type dated by Forsyth and Egan (2005, 90-96) to 1600-1700. There are identical examples illustrated by the PAS (such as ESS-05B994, NLM-3BED57). It is uncertain whether these are a contemporary design of the 17th century or a later copy of an old pistol evocative of a romantic past.

Two possible toy gun parts are also present. WA193 is a rather similar find in copper-alloy but is single-faced so probably forms one side (scale) of the handle of a toy gun. WA154 in copper alloy could be part of a toy, with its thick-rimmed cylindrical tube, as if forming a barrel, but no precise parallel has been found.

Two cast lead-alloy (probably pewter) wheels were probably for Victorian toys (**WA9999, WA9998).** A virtually identical example on the internet shows a toy elephant on a small wheeled cart (https://img1.etsystatic.com/000/0/5472159/il_570xN.313168147.jpg) but there are many similar toys from the late 19th century and later to which these wheels might belong. The PAS database has a similar example of a toy wheel from Odell, Bedfordshire (WMID-5EA385) dated broadly 1700-1900.

Other items; Folding balance

WA58 is the detached arm of a folding balance. WA58 is rectangular in section; at one end is a circular hole (incomplete), while the other end has a thicker and taller element with a chamfered terminal with a central circular hole. It is probably post-medieval from the neatly square-sectioned arm, which appears to be machine- rather than hand-made. Kruse (1992) illustrates medieval examples but these do not resemble the current find.

Modern finds (Late 19th-20th century)

Datable finds of later 19th century and later date are present in small quantities.

WA171 is one of a group of about identical 16 shallow concavo-convex iron discs. The concentric narrow lines internally on its concave surface identified by P. Sherman on close examination indicate it has been spun or turned so is relatively modern. However, its function remains uncertain.

A butterfly brooch in copper alloy (**WA28**) Is probably Art Deco costume jewellery, although it has lost its decorative surface enamel. A precisely similar example with intact enamel is shown on the internet though it lacks information on the date or manufacture. The style is consistent with a date in the 1920s.

Possible Agricultural Equipment

WA198 Thick iron bar, slightly curved, with truncated wedge profile, pointed terminal at narrower end; straight at thicker end. Paul Sherman suggests ‘this is a tine from a C19 iron leg cultivator’.

WA9961 Heavy square-sectioned shank, flattened and slightly narrower terminal, tapers at other end to rounded point.

WA170 Hexagonal-sectioned bar, one end broken, other tapering to narrow sharp point with rounded end;. This pointed hexagonal-sectioned spike may be agricultural, perhaps the tine of a spike-toothed harrow

A copper-alloy mount (**WA23**) has two stamped letters 'D.M. …', in a tall sans serif font of 19th-century or later appearance. Rounded end, flat object, other end broken; rounded upper edge and sharp lower; there are iron lugs on reverse for attachment

Undiagnostic finds

Some finds are not diagnostic of date and/or function, or their function and date are not understood.

Thus lead 'nails' are not closely dateable, and their function is not known. They are too soft to withstand much force or weight.

Copper nails are found in Romano-British contexts and one square-sectioned example, clearly hand-made (**WA37**), could be Roman. An example of a similar square-sectioned nail but with a larger head was found at the Roman harbour site of Portus in Italy (https://www.futurelearn.com/courses/portus/0/steps/10964). The others are more likely to be post-medieval. In the absence of a dated typology of these items it is difficult to assign them a date. However, copper nails were widely used in maritime contexts from the 1780s onwards when copper sheathing of vessels against teredo worm was becoming standard on commercial and naval vessels. As the iron nails and fittings in contact with sea water and copper were subject to galvanic corrosion, by the early 1780s iron was replaced by copper in Navy and merchant vessels alike (Knight 1973, 304-306; Solar and Rönnbäck 2015, 811).

Thin copper-alloy sheet fragments WA9992-4 may be part of a vessel or cladding. In the absence of diagnostic features, it is not possible to tell, and they are not datable on typological grounds.

A number of iron objects are difficult at the moment to parallel. They include WA75, a possible railing finial, while WA113 an iron object of circular plan with convex sides; large central hole 16mm diam; uncertain function but possibly a weight.

Other finds which are uncertain or difficult to parallel include:

WA34 Strap end with large circular hole; lobate terminal; flat undecorated surfaces; no parallels from Meols catalogue.

WA95 Buckle with single loop and decorative integral plate see Whitehead buckles pp 34-35 he dates 1250-1400; some have narrow plate as here; but the WA find has no space for the pin so it is not a buckle. WA label suggests it is a bridle piece but it is too delicate for a piece of horse furniture.

An edge binding strip (WA43) with small holes probably for stitches or small metal tacks. An edge binding strip recorded on the PAS database from Winteringham, Lincs, (NLM-8A3B53) has metal tacks but unlike the WA find is bent at a right angle as a box or casket edging rather than folded over as for this piece. The WA find may therefore imply a binding strip for a leather object or wooden vessel rather than the casket/box edging of the Winteringham find. The Winteringham find was considered to be Roman in date but the essential technique might be found later as a binding strip to stiffen and protect the edge of an object and the date is uncertain.

Examples of incorrectly identified items

Some of WA's claimed identifications are unlikely to be accurate. A small selection of those which have been claimed as significant finds relevant to the battle are mentioned here. The re-identification has the effect of reducing the number of early medieval finds.

WA179 Iron object of uniform thickness, with no sign of narrowing on either edge to a cutting edge; not a sword blade as suggested. Claimed as a sword fragment but there is no sign of a cutting edge on either side of the 'blade'.

WA13 A fragment of iron sheet, very corroded and with spalled surfaces. It is nearly flat, with a slight curve at one end, and near even thickness slight tapering to possible cutting edge quadrilateral in plan two right-angled edges; opposite are obtuse angle; not a sword blade; cutting edges are in the wrong position for a sword.

WA50 is listed as ‘Possible sword fragment’ but this has a flat profile, with no sign of a thicker central rib to blade or tapering across the profile to cutting edges; there is also no indication of differential corrosion which might indicate pattern-welding characteristic of Anglo-Scandinavian swords. This could be a fragment of iron sheeting. P. Sherman’s note recommends metallography – he writes, ’Nothing that jumps out to suggest this is a sword blade fragment just yet. X-ray and metallography may well throw some light on it’. Addendum: sample examined and identified by PS as a piece of thin section cast iron, probably guttering.

WA100a listed as ‘Smith’s Hearth Bottom’ This object has none of the characteristics of a smithing hearth bottom. This piece weighs 17g. WA100a is probably a small circular object, possibly a washer, although it is heavily encrusted with corrosion products which obscure any detail. (see right hand side of picture below).

Dungworth (2015, 36 fig 32) illustrates an ancient hearth bottom. Dungworth notes that hearth bottoms are ‘normally plano-convex to concavo-convex in section and circular or oval in plan. Their size and weight can vary considerably, from 100g to more than 2kg, although the majority weigh 200-500g. The upper surface sometimes has a depression produced by the air blast, or is sometimes irregular where the last formed slags have not been fully incorporated. The lower surface usually has impressions from charcoal or the hearth lining.’

WA98 is claimed as an ’axe blade’ is an iron object, two and half intact edges; appears to be a wrought iron plate with shallow plano-convex cross-section, with two opposed narrow ‘cutting‘ edges. Their position is impossible to reconcile with an axe blade. Cf. Ottaway (1992, 528) illustrates examples of axes at Coppergate York, which show that the blade invariably tapers from the socket towards the cutting edge, resulting in a triangular or wedge-shaped cross-section; see also medieval examples Goodall 2011, 29-31. X ray analysis has confirmed this is not a medieval blade as there is a rectangular hole punched through it which has corroded over.

Bone Report by Poppy Price (MSc student LJMU)

A singular piece of bone material was recovered by WA. This is a portion of the 3rd metacarpal from a sheep leg. The animal bone is 30% complete with both proximal and distal extremities not recovered. Due to the angle of the proximal portion of the shaft where the shaft would have connected to the metacarpal tuberosity the bone is likely to be from the right side of the front leg.

The overall condition of the bone was poor with an old deep crack running vertically from the proximal portion on the shaft measuring at 5.5cm in length. Another deep old crack runs vertically from the distal portion measuring at 2cm in length, and few other small cracks running both vertically and horizontally ranging from 0.5-1cm.

Behrensmeyers (1978) bone weathering stages places the bone at a stage 4 with a coarse, rough and fibrous surface containing small splinters and open cracks, caused by weathering that penetrates the inner cavities altering the bones structure (Lyman and Fox, 1989). The weathering stage 4 suggests it is 6-15 years plus since the time of death. However, due to the proximal and distal ends not being present means the age prior to death could not be calculated through statistical evaluation.

The anterior of the shaft appears slightly whitened in colour on the surface which can be due to sun bleaching, caused by UV rays destroying the organic material within the bone leaving only the inorganic component (Dupras and Schultz, 2013). On the other hand, the white colouring could also be from neutral lipids that are hydrolysed by lipases soon after death has occurred. This process enables the fatty acids to break down out of the glycerol structure creating a combination of saturated and unsaturated fatty acids. When the bone is left in an area with sufficient water supply it enables fatty acids to be altered and transformed into adipocere. Adipocere, just like sun bleaching can leave a white colouration to the bone (Dupras and Schultz, 2013; Stolze, 2014).

The posterior surface of the bone has a brown with a dull red tinge to the colour which is associated to a soil type that is well drained and in positive oxidizing conditions, created through the presence of iron bearing materials fund in silicaceous rocks (Dupras and Schultz, 2013).

Figure 1 Posterior view of the 3rd metacarpal bone of the sheep

Figure 2 Lateral view of the 3rd metacarpal sheep bone displaying the vertical crack 5.5cm in length

Areas on the bone that have been broken or cracked appear to be a light brown colour, suggesting they have had time to be stained by the soil it was buried in. Although, on the inside on the shafts cavity there are two small areas that are white in colour where flakes of bone have broken off after the excavation (Ubelaker, 1991).

Figure 3 Anterior view on the 3rd metacarpal sheep bone

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The WA Approach – Rob Philpott
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Conclusions

The following are conclusions reached by the writer based on observation of the finds assemblage, the accompanying documentation and the condition of the finds, and on discussions with members of WA and other observers. The number of potential weapons which had been suggested tentatively based on visual inspection only was reduced when additional information from X-rays which came late on in the project.

Significance of the material

1. Some of the finds correspond with what might be expected from activity associated with the presence of warriors, but the small quantity of confirmed weaponry, which has been reduced as a result of X-ray analysis, does not provide secure evidence of the battle site by itself. The gaming counters take a form typical of Anglo-Scandinavian type while the strapend and runic inscribed lead sheet belong to the correct broad period so could represent battle-related activity.
2. The amount of securely dated 10th-century material is limited but it is significant in a north-west context. The ironworking tools, material and waste could be associated with the battle but there is nothing intrinsically military about this part of the assemblage.
3. The finds do not represent conclusive proof that the battle of Brunanburh took place within the area of mid Wirral, but they are consistent with that interpretation.
4. Conclusive proof that the battle of Brunanburh took place in mid Wirral requires further corroborative evidence, which might include dated and diagnostic early medieval finds, a larger assemblage of battle-related items, and/or securely dated archaeological deposits of the relevant period.

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Abbreviations

PAS Portable Antiquities Scheme
WA Wirral Archaeology

Note

The present report was compiled during the COVID-19 lockdown using resources to hand and those available on the internet. However, no access was possible to academic libraries for specialist literature to undertake the necessary research into specific artefact types and comparanda. This report must therefore be considered as an interim.

SECTION C – REVIEW OF DOCUMENTARY EVIDENCE – Clare Downham

Contents

The historical background to the Battle of Brunanburh
The development of the Brunanburh narrative
The name of the battle site
Minor names and folklore
Why the Wirral?
How big was the Battle of Brunanburh?
The battle site
Conclusion
Bibliography

The historical background to the Battle of Brunanburh

The battle of Brunanburh has been integral to the narrative of the 'making of England' in the Middle Ages. When viking marauders arrived in Britain, there were multiple English kingdoms. Mercia was the kingdom which bordered the River Mersey and stretched as far south as London. Northumbria stretched north from a line between the Mersey and the Humber. Wessex covered much of southern England, and would in time absorb Kent and Cornwall. To the north of Kent, but south of the Wash was the kingdom of East Anglia. As a result of concerted campaigns by vikings in the 860s and 870s, large swathes of territory including East Anglia, Northumbria and half of Mercia would fall under viking control. This left Wessex as the only fully independent English kingdom by the end of the 870s. Alfred the Great of Wessex and his descendants gradually conquered the land from vikings to create a unified kingdom of England. This process would not be complete until the death of the last viking king of Northumbria in 954.[2]

The first king who could claim to unify the English-speaking peoples was Athelstan, grandson of Alfred the Great. He inherited the thrones of Mercia and Wessex (which included East Anglia) from his father Edward the Elder. In 927 he successfully seized Northumbria from viking hands. Athelstan had ambitions to be the most powerful ruler in Britain, and sought over-lordship over the Welsh and Scottish rulers. He claimed to be 'rex totius Britanniae' (king of all Britain) on coins and in his charters.
As Athelstan came to use more aggressive policies to achieve this aim, a coalition of opposing rulers would draw together against him. These tensions would culminate in the Battle of Brunanburh.

Athelstan's main opponents at Brunanburh were Constantine, king of Alba (the embryonic kingdom of Scotland), and Olaf Guthfrithsson, king of Dublin. Olaf's family were heirs to the throne of Northumbria which had been under viking rule from 866 to 927. The family had been unable to make a concerted effort to win back Northumbria after 927 due to rivalries within Ireland between the viking kings of Dublin and Limerick. It was only when Olaf Guthfrithsson defeated his Limerick rival Olaf 'Scabbyhead' in 937 could he return his attention to matters across the Irish Sea. Constantine's motives for allying against Athelstan in 937 were quite simply revenge. In 934 Athelstan had ordered an invasion of Alba by land and sea. The land army is said to have reached as far north as Dunottar and the fleet went to Caithness. The expedition does not seem to have been intent on conquest but rather to subdue Constantine as Athelstan's under-king. Both

[2] For reference in this section see Downham, *Viking Kings,* pp. 99-105.

Constantine and Owain of Strathclyde (a neighbouring polity based on the River Clyde) are found witnessing charters of Athelstan after 934 as *subreguli* 'sub-kings'. Constantine may have bided his time after 934, working towards a coalition that could undermine Athelstan.

It seems Northumbria's allegiance was also in question during this northern campaign as *Historia Regum* (Part 1) Athelstan took hostages on his way north. In 934 he also gave large gifts to the archbishop or York and the shrine of St Cuthbert to win the acquiescence or support of the most powerful churches of Northumbria for his actions. While the somewhat jingoistic presentation of Brunanburh as a conflict between the English and a coalition of their enemies is a familiar trope, it must be remembered that a unified kingdom of the English-speaking peoples was a political novelty at this time. The Northumbrians had a long and eminent history as an independent people, and not all may have been keen to fall under the control of Wessex or seen their line of Hiberno-Scandinavian kings as oppressors. It is interesting that the 'Anglo-Saxon Chronicle' makes no mention of the Northumbrians fighting at Brunanburh, suggesting the position of their nobility may have been ambivalent.

There were other rulers who appeared to join the forces of Constantine and Olaf. The 'Anglo-Saxon Chronicle' mentions the death of five kings in the battle, suggesting a wide-reaching coalition. One likely contender is Owain, king of Strathclyde as *Historia Regum* (Part 1) describes the involvement of his people. It is possible a Manx/Hebridean contingent may have been involved in the conflict. While there is evidence that Welsh rulers were called to fight against the English, in the tenth century prophetic poem *Armes Prydein Vawr* it is not clear if any took part in the Battle of Brunanburh. The English speaking polity of Bamburgh wedged between Northumbria and Alba may have been involved, but again the sources do not give a full picture of events. Ultimately the range of the people involved in the conflict was significant, making it one of the most important battles that was fought on English soil before 1066. In terms of political impact, the battle was perhaps less glorious than the poet whose composition was included in the 'Anglo Saxon Chronicle' made out. There were heavy losses on both sides and the conflict only kept the English kingdom together for two more years until Athelstan died. At that point, Northumbria once again fell under the control of the viking dynasty of Dublin.

The development of the Brunanburh narrative

Through looking at the early texts describing the Battle of Brunanburh, it is possible to trace how the narrative of the battle developed over time. This can help evaluate the reliability of various claims relating to it.[3]

The earliest and most comprehensive source is the Battle of Brunanburh poem which was entered into the 'Anglo Saxon Chronicle' before AD 955. The account may be biased as it celebrates the English victory, but being within living memory of the events it describes, it could not invent key aspects of the conflict without being open to challenge. The Chronicle poem located the conflict 'near Brunanburh'. The combatants are identified as the people of Wessex and Mercia on one side, led by King Athelstan and his brother Edmund. The enemy is identified as Constantine king of the Scots, whose son was killed in the conflict and Olaf, king of Dublin. The battle is described as a heavy defeat for the English enemies. Olaf fled with a small band of followers and Constantine escaped home to Scotland while the departure of the ships of Northmen to Dublin from 'Dingesmere' is also reported. The battle was fought from sunrise to sunset with those fleeing the battlefield being pursued. Five 'young kings' were killed and seven of Olaf's earls. A curious feature of the poem is the lack of reference to Northumbrians which suggests their allegiances may have been split in the conflict, they fought with the 'enemy' or they did not take part at all. The 'Anglo-Saxon Chronicle' underlies many of the later accounts of Brunanburh, in particular the 'Chronicle

[3] The relevant sections of texts referenced in this section can be found in Livingston ed. *The Battle of Brunanburh.*

of Aethelweard', written around 980 and the early twelfth century English historians, John of Worcester, Henry of Huntingdon, Geoffrey Gaimar and William of Malmesbury.

The 'Annals of Ulster' must be given serious consideration as a primary source for Brunanburh, as much of the data within it reflects near contemporary records. According to this source, the man combatants were Olaf and Athelstan and there were heavy losses on both sides. 'King Olaf escaped with a few men', echoing the account in the 'Anglo-Saxon Chronicle' and it was a great victory for Athelstan. The 'Annals of Ulster' report that Olaf did not return to Dublin until 938, thus it appears he did not go straight back to Dublin with his small band of escapees, although the 'Anglo-Saxon Chronicle' implies the bulk of his followers did so. Olaf may have spent the months after the conflict trying to negotiate with allies. He would eventually regain control of Northumbria in 939 after the death of Athelstan.

There are other key details concerning Brunanburh that are drawn from other sources, which are generally later and whose validity may be called into question. A lost Northumbrian chronicle appears to underly an account of the battle found in two texts associated with the early twelfth century writer Symeon of Durham. A short chronicle covering the events 888-957 is the sixth text in the compilation *Historia Regum Anglorum.* Symeon was the author of one of the later sections of this text. The chronicle is question was put together after 1064 but it copies earlier material, and includes some tantalising details which are not in the 'Anglo-Saxon Chronicle', but which might date back to the tenth or eleventh centuries. It claims that the invading force comprised of 615 ships, and that the battle took place at a site called Wendun. It also reports that the men of Strathclyde fought alongside Constantine and Olaf. The same additional information is found in *Libellus de Exordio* which was written between 1104 and 1115 by Symeon of Durham. Both texts would seem to hearken back to the same chronicle text. The claim of 615 ships is also included in the 'Chronicle of Melrose' which drew on *Historia Regum.* The presence of Strathclyders at the battle finds some independent support in 'The Annals of the Four Masters' this is an early seventeenth century compilation which copied earlier Irish chronicles. The men of Strathclyde maybe the people Aethelweard means when he refers to Picts fighting along with Scots at the battle, although this would represent a misunderstanding of North British geography. The Picts and people of Strathclyde are mentioned in the battle in the early twelfth century *Estoire des Engleis,* written by Geoffrey Gaimar. On balance the evidence surviving from the lost Northumbrian chronicle which underlies section six of *Historia Regum* and *Libellus de Exordio* is treated as credible evidence.

Due to the significance of the 'Battle of Brunanburh' and its value as propaganda in demonstrating a victory by the English over their neighbouring peoples, the story drew in extra details and legends over time. Perhaps the most controversial of these is that the invasion fleet of 937 came via the River Humber. If this were true, then the Wirral would be a most unlikely site of battle as the army would have to have traversed England to reach the Irish Sea. The claim is first found in the 'Chronicle of John of Worcester 'which was written between 1128 and 1140. Michael Wood argues that 'the tale of the Humber Landing cannot be John's own invention. His statement is repeated verbatim by several other annalists of the twelfth century and later'.[4] However, while the tale of the Humber landing is widely disseminated, all instances can be traced back directly or indirectly to John of Worcester.

John of Worcester was a source for *Historia Regum* (Part 8) attributed to Simeon of Durham. *Historia Regum* was then used as a source for Simeon's *Libellus de Exordio.* Then *Historia Regum* or *Libellus de Exordio* were used for the Brunanburh account in Peter of Langtoft's chronicle.[5] *Historia Regum* was used as a source for Alured of Beverley, as well as the mid-twelfth century *Historia Saxonum sive Anglorum post obitum Bedae*, and for the 'Melrose Chronicle'.[6] Both *Historia Saxonum sive Anglorum post obitum Bedae,*

[4] Wood, 'Searching for Brunanburh'.
[5] Livingston ed., Battle, p. 220.
[6] Twomey, 'Historia Saxonum'.

and the 'Melrose Chronicle' were sources for Roger of Howden's *Chronica* written *circa* 1200.[7] Roger of Howden was then used as a source for Roger of Wendover's *Flores Historiarum*.[8] *Flores Historiarum* was used a source for the *Chronica Majora* of Matthew Paris.[9] John of Worcester was used by Ranulf Higden in his popular fourteenth century universal chronicle *Polychronicon*. *Polychronicon* was in turn used as a source for the fifteenth century 'Book of Hyde'.[10] Another medieval text which referred to the River Humber was the thirteenth century 'Metrical Chronicle' attributed to Robert of Gloucester. This text drew on a complex array of earlier chronicles including John of Worcester, *Historia Regum*, Roger of Howden, Roger of Wendover and Matthew Paris, all of which, as noted above make reference to the Humber in their account of the battle.[11] There need not be a common 'northern source' which mentions the River Humber that underpins the narrative of John of Worcester, as suggested by Wood. Rather the tale of the Humber landing could have been John's invention and disseminated from there. The Humber invasion story cannot be traced to an earlier source.

Other elements which were added to the Brunanburh tale were more fanciful. One of these begins with the late eleventh century author, Eadmer of Canterbury. His story turns the battle into religious propaganda. The viking side at Brunanburh are presented as pagans hell bent on destroying Christian laws. Eadmer claims that Athelstan brought Oda, future archbishop of Canterbury, with him to the front line of the conflict. The king's sword shattered at the hilt but was restored through a miracle of Oda which helped secure Athelstan's victory in the battle. A retelling of the same event is given in Eadmer's 'Life of Oswald' which was written around AD1115. It is unlikely that any of these details can be relied on, but variations of the miracle story appeared in later accounts including William of Malmesbury's *Gesta Regum Anglorum* of c. 1127, the 'Chronicle of Ramsey, c. 1170 and the 'Geneology of the kings of England', c. 1274.

Another legend which added to the Brunanburh story is first found in the *Gesta Regum Anglorum* of William of Malmesbury written in 1127. He recorded Olaf had ventured into the enemy camp disguised as a harper the night before battle in oder to gather information. He then murdered a bishop and some others who accompanied Athelstan's army and approached the sleeping king to murder him to, however he was woken by the noise. Athelstan's sword fell in the chaos but crying out to Saint Aldhelm it was miraculously restored and the king was able to save himself. This story seems to conflate a version of the sword miracle mentioned above and a tale which is recorded earlier in *Gesta Regum Anglorum* that King Alfred the Great had entered the viking army camp disguised as a harper to gather information before the Battle of Edington in 878. The story of Olaf's exploits as a spying musician is included in the late thirteenth century 'Chronicle of Robert of Gloucester' reason. It appears then that stories of the battle grew over time.

One narrative which has received a lot of attention as a source for the Battle of Brunanburh is the Icelandic 'Egils saga'. This text dates from the early thirteenth century and is praised for its detailed description of the conflict. However so many details of the battle described in the saga do not match with Brunanburh, it is not clear if it is even the same battle that is recounted. Athelstan is leader of the English side, but his opponent is Olaf king of Scotland who died in the conflict. If this is Brunanburh some details have got confused (Olaf would appear to be both with Constantine and Constantine's son who was killed in the battle). The text also claims that Olaf had previously won a victory bringing parts of England under his control, which is also not true of events in 937. If such essential elements of the narrative are wrong then it should be questioned whether other details of the battle narrative are correct or relate

[7] Gillingham, The English in the Twelfth Century, p. 71.
[8] Corner, 'Wendover, Roger of'.
[9] Ruch, 'Roger'.
[10] Gransden, *Historical Writing in England*. II.44.
[11] Fisher, 'Once called Albion', pp. 120-121.

to Brunanburh, especially as this is a saga, not a history. A modern equivalent would be to take a historical novel based on oral sources of an English Civil War conflict and treat it's account as correct in its details of the fight.

The approach taken to historical data in this feasibility study is to apply a sceptical approach to late sources, and not to cherry pick data from some texts which suits an argument while rejecting other data without clear reasoning. Using such analysis we can put aside John of Worcester's claim that Olaf's fleet arrived by the River Humber as a confusion with another historical event (Fulford) just as we can put aside William of Malmesbury's claim (written around the same time) that Olaf dressed as a harper to infiltrate the enemy camp, influenced by a story linked to another battle (the story of Alfred at the Battle of Edington). Of course, opinions on how sources should be treated will differ from person to person, such is the nature of historical argument.

The name of the battle site

The battle is referred to in a wide range of medieval texts. The most reliable witnesses are naturally those which are closest, chronologically and geographically, to the event. The different name forms presented in key texts are as follows:

Anglo-Saxon Chronicle A	Brun(n)anburh (second n added in correction)
Anglo-Saxon Chronicle B	Brunannburh
Anglo-Saxon Chronicle C	Brunnanburh
Anglo-Saxon Chronicle D	Brunanburh
Anglo-Saxon Chronicle E	Brunanbyrig (dative case)
Aethelweard	Brunandune
Annales Cambriae	Brune
Book of Taliesin (speculative)	brydawt
Chronicle of the Kings of Alba	Duinbrunde
Symeon of Durham, *Libellus*	Brunnanwerc, Brunnanbyrug, Wendune
William of Malmesbury	Brunefeld
John of Worcester	Brunanburh

There is some debate as to whether the reading of the 'Anglo-Saxon Chronicle' B manuscript (which dates to the late tenth century) presents one 'n' or two which is significant for interpreting the meaning of the name (although spelling conventions were not fixed). The name appears on the top line of folio 31v which is very worn. Of different editors of the text Whitelock read 'nn' and Taylor read 'n' however study of the digitised scan of the manuscript on the British Library website, in this author's opinion, favours the interpretation of the spelling as Brunnanburh. This reading has also been advocated by Michael Wood.[12]

The first element of the name can be interpreted as *Bruna,* a masculine Old English personal name or *brune* a name meaning 'dark, brown, shining', or a variant of *burne,* an Old English word for stream, well or spring, influenced by Old Norse *brunnr*. The word appears in English forms of the name with the weak genitive form ending -an. The spelling with 'nn' would favour the second interpretation, associating the site with a stream.

The second element *burh* is an Old English term meaning a fortified place or stronghold. A different second element found in Aethelweard's *Chronicon* is *dun* which in English place-names tend to define a low hill with an extensive summit, usually 200-500 feet above sea level. The twelfth century writer William of Malmesbury use the ending *feld* denoting the 'field' of conflict. Another spelling presented by another twelfth century author Symeon of Durham ends in *werc,* or Old English *weorc* from which is derived modern English 'work' and could refer to a fortification, although the term 'weorc' as a variant for 'dun' in place-names is not common. Symeon of Durham also presents a completely different name for the battle site which is We(o)ndune. Old English *wen* is a term found in place-names to signify a mound in the landscape that resemble a swelling or tumour. It might also be linked to the Old English adjective *weoh* which means 'holy'.

The spelling of the name in Scottish and Welsh texts is also interesting. The name in the 'Chronicle of the Kings of Alba' reverses the order of the first and second element of the name, making it similar to other Gaelic names beginning with *dún* which signifies a fortification. The form in *Annales Cambriae* may just be a simplified version of the English name.[13] Taking the different forms of the names together which date to the tenth to twelfth centuries, the location of the battle is close to a fortification (the 'Anglo-Saxon Chronicle' tells us the battle was fought 'near Brunanburh') and the battle site is associated with an area of higher ground in the landscape.

<u>Locating the name Brunanburh</u>

A key issue in the debate locating the Battle of Brunanburh is John of Worcester's twelfth century account of the battle. He described the joint forces of the Scottish king Constantine and the viking ruler Olaf as arriving in England by the River Humber (*ostium Humbre fluminis … ingreditur*). This has naturally led to a number of theories that the battle was fought in eastern England. John wrote roughly two centuries after the conflict so the reliability of the statement may be questioned. John's main source for the battle narrative was a version of the 'Anglo-Saxon Chronicle', yet the surviving versions of that text make no mention of the Humber. John may therefore have been making an assumption that a Scottish-led invasion of England would have attacked via the River Humber, or he may have had access to an otherwise lost source or tradition. It has been suggested that John's thinking was influenced by a later battle, fought at Fulford in 1066, when an invading force led by Harald Hardrada of Norway attacked England via the River Humber. Scholars are left

[12] Wood, 'The spelling of Brunanburh'.

[13] Halloran 'The Identity of Etbrunnanwerc', p. 251, suggested the name linked to the Modern Welsh 'bron' meaning breast or hill.

with two options, either to accept the late evidence at face value and look for a battle location in Yorkshire, or to focus on the earliest, most reliable sources, to look for a location using a smaller body of material.

Paul Cavill argued that Brunanburh can be linked with Bromborough in the Wirral based on a detailed linguistic argument. The stages in the development of the name are outlined as follows: the loss of nasal (n) after an unstressed syllable, syncope of the unstressed vowel (a), assimilation of 'nb' to 'mb', lowering of 'u' to 'o', development of 'burh' to 'borough'. Each stage of development is attested by different spellings of the name in twelfth and thirteenth century documents.[14]

Brunberg (1100-1135) Bruneberg (1153) Brumburg (1153) Brombur (1153-59) Bromboreh (c. 1200)

Bromborough is the only English place-name that can linked directly with the name Brun(n)anburh. A number of other theories locating the battle are entirely speculative, e.g. seeking a feature in the landscape that relates to high ground, or a stream, or a fortification, which could fit with the name Brunanburh but which are not attested. Of course such a configuration of features offers a vast range of potential locations and so this seems to be an unscientific method of identifying a battle site. Other theories only account for one element the name Brunanburh or Wendune (e.g. the River Browney or the River Went) and assume that this was once combined with another element (e.g. burh or dun) in a form which has not been historically attested. This is also a rather speculative method. A number of place-name theories have come forward which are linguistically flawed and Cavill has sought to call these out. In sum, on linguistic ground, a case can be made for Bromborough being identified with Brunanburh which cannot be matched with evidence from any other English place-name. It is possible that there may have originally been more than one place called Brunanburh in England, but it is surprising, if it was an important and strategic site, that record of the name would be lost.

There may be other hints in the early records of the Battle of Brunanburh which could hint at its location. Taking the first element of the name as an Old English word (*burne*) influenced by an Old Norse word (*brunne*) might point to an area of mixed English and Scandinavian settlement. This would be relevant to a large swathe of northern and eastern England that was settled by vikings, including the Wirral. Comparison may be made with the name Greasby in the Wirral, which was originally Old English *græf burh* but the second element of the name was changed to *-býr*, through the influence of Old Norse speech in the area. It is also interesting that there are independent Welsh and Gaelic names for the name of the battle (albeit derived from an English name). This might lead one to assume that the place in question was in contact with Welsh and Gaelic speakers, which could fit the pattern of cross-cultural contact that we see in the Wirral, close to the border with Wales and with wide-ranging links across the Irish Sea.

In identifying Brunanburh with Bromborough, Cavill argues that the name Bruna or Brune (perhaps Brunne) applied to an area of the Wirral. This follows the arguments of Dodgson in suggesting the first element of the name is also found in Brimstage (three miles west of Bromborough) and Brimston (a place name which is now lost). This could suggest that the name Bromborough was linked with a larger tract of territory than today, perhaps co-extensive with the Domesday manor of Eastham (in the twelfth century, Eastham was a chapel dependent on the church at Bromborough).[15] The manor included the parishes of Eastham and Bidston, and thus comprised a significant tract of land on the Mersey side of the Wirral. In identifying the -dun name element which is found in records of the battle, Cavill notes that there are a number of low hills in the Wirral. On inspecting a contour map of the Wirral, the nearest high ground near Bromborough (with an elevation of over 55 metres above sea level) is a narrow ridge running roughly north

[14] Cavill, 'The Place-name Debate', p. 344.

[15] Dodgson, *Place names of Cheshire,* IV. 239.

to south, which follows the line of Mount Road from Red Hill Road to Prenton Lane. This may be significant in marking a historic routeway through the medieval landscape. The southern tip of the high ground would give a strategic vantage point over troops heading from the east to this area and that maybe significant for the site of the conflict.

Bromborough Court House

A suggested location for the fortification of Bromborough is the site of Bromborough Courthouse. The name 'Bromborowe Corte' is recorded 1539-47. A house stood at this site from around 1680 until 1969. The site was once occupied by an 11th century manor house of St Werburgh's Abbey.[16] The manor was placed at a well defended site between the Mersey estuary and a natural inlet. An earthwork around the site enclosing around nine acres has been identified but not dated. Big Heritage dug five trial trenches at the site in 2014 but the bulk of material that was recovered date from the seventeenth century onwards.[17]

Brimstage

Brimstage was linked with 'Brunnanwerc' (named by Symeon of Durham) by Francis Tudsbery in 1907 and the theory has been repeated, although there is no known archaeological evidence.[18] One hypothesis is that the later medieval hall at Brimstage superseded an earlier fortification. The hall is sited on a flat mound which was once enclosed by a moat, but prior to the moat the site is naturally defended to the north by a stream with sandstone banks. The name is recorded as *Brunstath* in 1260, *Brimstache* in 1275, and *Brunstach* in 1326. It can be interpreted as 'Bruna's landing-place/ river-bank', deriving from the male personal name *Bruna* + OE *stæth*, or it may derive from OE *brūn* 'brown, dark; shining'. + OE *stæth*, 'river-bank'.[19] The first element of the name is shared with Bromborough. Brimstage oversees a natural communication route running north-south through the Wirral.

Locating names associated with Brunanburh

Apart from the name Brunanburh, only one other place-name relating to the battle site is given in the 'Anglo-Saxon Chronicle' account. We are told 'Departed then the Northmen in their nailed ships, dreary survivors of the spears, on Dingesmere over deep water to seek Dublin'. Dingesmere is thus a body of water (mere) where the army of Dublin moored their ships prior to battle. The meaning of the first part of the name 'dinges' has been debated. One possible translation is 'mere of noise' linked to the Old English word *dynge*, although Cavill *et al*. consider this unlikely. Another possibility which does not seem to have been discussed previously is that this form could be derived from the Old English personal name Dynne. This would fit into a common pattern of medieval toponyms being formed from a personal name + topographic feature, suggesting a mere 'body of water' belonging or linked to Dynne. The spelling 'nn' and 'ng' can be interchangeable, reflecting a velar nasal sound. The 'Prosopography of Anglo-Saxon England' has four examples of the personal name Dynne, including a ninth century Mercian lord.[20] Cavill, Harding and Jesch have linked the first element of the name to the Old Norse word 'thing', referring to an assembly place and linked it to the place-name Thingwall.[21] Thingwall in the Wirral occupies a fairly central place in the peninsular and does not preside over a body of water in the present day. A departure point on the River Dee has been suggested by Cavill *et al*. Given the suggested location of the battle near Bromborough, it may

[16] Historic England: Bromborough Court House.
[17] Big Heritage, 'Bromborough Courthouse 2014' http://bigheritage.co.uk/bromborough-courthouse/.
[18] Tudsbury, *Brunanburh*, p. 5.
[19] Deakin, '*Brūnanburh'*.
[20] Prosopography of Anglo Saxon England: Database Home (pase.ac.uk)
[21] Cavill, *et al*., 'Revisiting Dingesmere'.

have made more sense to moor ships on the Mersey side of the peninsular. The coastal topography of the Wirral has changed significantly since the Viking Age, due to movements of sand, silt and human intervention such as drainage works. In the Middle Ages there would have been large pools at Bromborough and Wallasey.[22] The name Wallasey means 'island of the Welsh' and suggests that in the early medieval period the area was largely cut off by marshland and water. Prenton Brook which rises near Thingwall would have flowed into the River Fender towards Wallasey. It is possible that the earlier, larger Wallasey pool was the 'Dingesmere' as a place where ships could be moored by people travelling from outside Wirral to the local centre of government.

An area of high ground might give rise to the name form 'Wendun' recorded in *Historia Regum* attributed to Symeon of Durham but in a section of the text which may date to the late eleventh century and which includes tenth century material.[23] The second element 'dun' is from the Old English word for hill. The 'wen' element could relate to a few different words, as the Old English word for a cyst, it might describe the shape of a hill, or if could link to the Ole English word *weoh* meaning 'sacred' or Brittonic *winn,* meaning 'light', or 'fair'. The form might find some correlation with the place name 'Welondrys' recorded in 1357. Richard Coates interprets the origin of this name as *weoh* [sacred] + *land* [land] + *hris* [scrub], that is scrubland with a religious association. This name is now lost but has been identified as an earlier name for Rice Wood, an area of former woodland (on low ground) to the south east of Bromborough Pool.[24]

One other late source which gives another place-name linked to the battle is the 'Annals of Clonmacnoise' this is a seventeenth century English translation of an earlier Irish chronicle. While the source includes tenth century data, it cannot be guaranteed that unique material in the text does not derive from a later source. The 'Annals of Clonmacnoise' records the battle as taking place 'on the plaines of othlynn'. Cavill has endorsed Nick Higham's suggestion that this refers to the eastern boundary of Cheshire called the Lyne or Lyme.[25] At its nearest point, this area of upland lies 25 miles east of Bromborough. This seems too far away to be realistic, unless perhaps the text is alluding to a drawn out skirmish along a zone of landward retreat by Scottish forces from the battle.

An account of a battle which is often identified with Brunanburh, is found in the Icelandic Egil's saga, which can be dated to the early thirteenth century. Recently Adrian Grant has highlighted the numerous factual discrepancies in the Egil's Saga account which mean it may not refer to the same conflict.[26] Briefly summarised, Egil's saga states:

1. The conflict took place early on in Athelstan's reign (it did not)
2. The king of Scotland is identified as Olaf (not Constantine),
3. There are two named British leaders, the brothers Hring and Adils (but they cannot be identified in historical sources)
4. Initially Olaf wins a battle and subdues all Northumbria (but Northumbria was ruled by Athelstan since 927 and until the battle)
5. In the following conflict Olaf is killed (Olaf survived Brunanburh, as did the king of Scotland).

[22] Note however sea levels globally appear to have been slightly lower than today. The differences in coastal topography relate to movements of sand/silt and human activity such as drainage. There seems to be something of a local misperception on this matter, but scholarship over the last ten years is unambiguous on the matter, e.g. Kemp et al. 'Climate related sea-level variations'.

[23] Downham, 'Chronology', pp. 36-37.

[24] Coates, 'A Further Snippet', pp. 288-89.

[25] Higham, 'The context of Brunanburh', p. 152, n. 66.

[26] Grant, 'Egil's Saga',

The surrounding chronology of events also seems to be incompatible with Brunanburh. Grant suggests that the saga narration provides a garbled account of events in 927 when Athelstan won Northumbria from viking hands.

Given that the account in Egil's saga has such a tenuous relationship with real events we cannot be sure that the conflict narrated is indeed Brunanburh or that any details in the text can be relied upon. Nevertheless, scholars have evaluated the place names to try and shed light on the Battle of Brunanburh. The saga gives the place-name Vínheiðr ('heath of the River Vína') and Vínuskógi ('wood of the River Vína'). Attempts to link the 'Vína' element to the 'Wen' of Simeon of Durham's Wendune have been shown to be linguistically implausible by Matt Townend. Similarly, the location of a battle in the Middle Ages on open land near woodland should not be surprising, and could relate to a myriad of locations.

In general, attempts to locate the battle of Brunanburh using recorded names other than Brunanburh itself fall into difficulties of interpretation, both in the meaning of the names and how they fit with the landscape. The strength of the Bromborough-Brunanburh link is that the recorded forms of the name Bromborough can be linguistically linked to the medieval name form Brunanburh. No other names offer us the same linguistic link between a place named in the battle accounts and a place identified in other medieval texts.

Minor names and folklore

Folklore relating to field names and field names themselves have been popular sources in seeking to locate the Battle of Brunanburh.[27] One major challenge with using folklore as evidence is that Wirral stories linked to Brunanburh are not recorded before the late nineteenth century, over 900 years after the battle. There is also folklore linked to other sites which have been claimed for the Battle of Brunanburh. For example, folklore around Burnley in Lancashire is discussed by Thomas Wilkinson in 1857.[28] Folklore does not therefore present a stronger case that the conflict was fought near Bromborough than some of the other posited locations.

Folklore does not just originate from events. It can originate from texts, with people taking ideas they have read or heard about and applying them to the local landscape.[29] A good local examples of this process in the Wirral is at Thurstaston. In 1866 James Picton wrote that there were no local traditions concerning the the sandstone outcrop at Thurstaston when he put forward his theory that it was linked with Thor.[30] However, as a result of his publication, over one hundred years later, popular folklore concerning the site abounds. This includes the story the red veins in the sandstone of 'Thor's stone' are linked to blood sacrifice to the Norse God, or that Thor once dropped his magical hammer here, or even that the stone serves as a pagan memorial to the Battle of Brunanburh.[31] The stories continue to live and grow, despite the etymology of Thurstaston being shown not to link to 'Thor's stone' but 'Thorsteinn's tún' (The settlement of someone called Thorstein). Folklore can tell us more about nineteenth and twentieth century imagination, or the relationship of textual and oral traditions, than they do about tenth century events.

The land by the seashore at Bromborough called Wargraves has been popularly associated with the conflict.[32] The first recording of the name is quite early, being documented in a 1731 map. However the etymology of the name is not as it may seem. It most probably relates to Middle English *were* (meaning land of low value) and Old English *graefe* meaning a wood. The record of the name as 'Wergreaves' in 1839 reflects the earlier spelling. The place-name expert J. McN. Dodgson ultimately concluded 'The name is not evidence for a battlefield'.[33]

There are a number of other place-names in the Wirral which are popularly linked with the battle. The roadway leading down from Mount Road to Storeton hill is plausibly a strategic area linked to the battle. It is named Red Hill road (the first attestation appears to be after 1839). Paul Cavill comments 'There are quite a few Red Hills, and it's unlikely that this one is much different from the others'.[34] In 1964 Ann Anderson mentioned folklore linking this name to a battle site, and in 1999 Allan Alsbury noted that the name was linked by locals to the blood that was said to have flowed down it.[35] The 'red' name however could link to vegetation or the local sandstone which ranges in colour from white to red with grey and yellow tones between. The stone was quarried from Storeton from

[27] Grant, 'Egils saga'.
[28] Wilkinson, 'On the Battle', p. 39.
[29] Downham, 'Memorialisation of vikings'.
[30] Picton, 'The great stone of Thor', pp. 364-65.
[31] Harding, *Ingimund's saga*, pp. 171-78.
[32] Hidden Wirral Myths and Legends: The Battle of Brunanburh http://www.hiddenwirral.org/battle-of-brunanburh/4590122188
[33] Dodgson, *Place-names of Cheshire*, IV.242.
[34] Paul Cavill pers comm.
[35] Cited by Harding, *Ingimund's Saga*, pp. 131-32.

the fourteenth to the twentieth centuries and possibly from an earlier date.[36] Cavill notes that 'Red' in this context could also be a corruption of 'reed' as in 'hill where reeds grew'.[37]

A local field name 'Bowman's field' in Storeton cannot be tracked in historical sources, it could be linked to the surname 'Bowman' which is fairly common in the Wirral and Lancashire. It may be linked with the modern house name 'Bowman' on Lever Causeway. Alsbury also gives two local names 'Soldier's Hill' and 'Battlefields' on Rest Hill road which runs parallel to Red Hill road between Storeton and Higher Bebington. Paul Cavill notes that both names are definitely post-Conquest and cannot be contemporary with Brunanburh.[38] The origins of these names have not been found in the *Place-names of Cheshire* or Ordnance Survey maps. It is therefore possible that the names 'Soldier's Hill' and 'Battlefields' have been assigned to places quite recently as a result of folklore surrounding the battle site. Paul Cavill agrees that a derivation from folklore is likely.[39]

Stephen Harding notes that 'in the early decades of the twentieth century local historians were fostering the belief that the battle had taken place' in this area.[40] This may have led local legends to spring up. Harding also refers to a story for the late 1950s that King's road (on the other side of Mount Road from Rest Hill road) was named after King Alfred who came to fight the Battle of Brunanburh. Although this is a historically impossible (Alfred was long dead by 937) and the road is probably modern in origin, it demonstrates local interest in the battle.[41] Another piece of local lore mentioned by Harding is that the Lancelyn-Green family of Poulton Hall consider that the hall may be the original site of 'Brunanburh', although there is yet no evidence to support the argument apart from the strategic location of the hall and evidence of a late medieval building on the site which preceded the current hall.[42]

Other names which have been mentioned by parties interested in the battle include:

Daynegreuesway, Bromborough (first recorded in 1412) meaning 'the dairy maids' copse' according to Dodgson from dæge (dairymaid) + græfe (wood/ copse) + weg (way). This is despite superficial appearances that the name refers to Danes or Graves.
Dedemonnes Greue, Storeton (first recorded 1323) meaning 'deadman's wood/ copse. The name refers to woodland not a grave. The name is genitive singular referring to a single 'dead man' rather than many.[43]
Gremotehalland, Storeton (first recorded in 1330) meaning the 'headland of the meeting under a truce', heafod-land + grið-(ge)mot.[44]
Lathegestfeld, Bromborough (first recorded in 1412) meaning 'the field of the unwelcome visitor' from either Old English lað + gest or Old Norse leiðr + gestr.[45] Any link between the 'unwelcome visitor' and the invasion of 937 must be speculative.
Mutler/Mutlow (first recorded 1840) The name Mutler applies to a group of 16 fields which comprise a single rectangular block of land a short distance south-west of Brimstage hall and adjacent to another group of four fields in a single block with the name Mutlow. These names are linked and may represent the outline of two earlier fields or perhaps a singular block. The name can be linked to Old English *(ge)mot hlaw* meaning 'moot hill'. It has been suggested this an early assembly site

[36] British Geological Survey, Building Stone Atlas of Merseyside.
[37] Cavill, *New Dictionary*, p. 354.
[38] Pers comm. Cf. Cavill, *New Dictionary*, pp. 25, 392.
[39] Paul Cavill pers comm.
[40] Harding, 'Wirral: Folklore and locations', p. 353.
[41] Harding, *Ingimund's Saga*, p. 133.
[42] Harding, 'Wirral: Folklore and locations', p. 355.
[43] Dodgson, *Place-names of Cheshire*, IV.256.
[44] Ibid.
[45] Ibid.

preceding Willaston's role as the meeting place of the hundred court of the Wirral described in Domesday book. However, two objections can be raised to this theory, there is no obvious hill to fit with the *hlaw* of the name, and Dodgson in the *Place-names of Cheshire* suggests it is linked to the local surname Motelowe recorded at Bromborough in 1398, thus these lands may have belonged to that family.[46] Furthermore, the name is north of Raby (the boundary settlement – perhaps marking the limit of jurisdiction of the territory once occupied by the Hiberno-Scandinavians) and one would expect Thingwall (which bears an Old Norse name meaning 'assembly field') to have been the main assembly place of the area, before its land fell under the jurisdiction of the hundred court at Willaston.
Normans Hey, Bromborough (first recorded in 1839) most probably taken from the personal name Norman, which originally derived from the word 'Northman'.[47]
Umberstone, Storeton (first recorded in 1839) meaning 'mutilated stone or rock' given that there is no major waterway, I do not think this can be linked to John of Worcester's claim that the invading fleet for Brunanburgh came via the River Humber.[48]

Why the Wirral?

There has been much debate among historians concerning the location of the Battle of Brunanburh. Nevertheless, in addition to the place-name evidence, the association of the battle with Bromborough on the Wirral makes sense from a tactical point of view. The invading forces would have many concerns which might include:

How do we co-ordinate our attack?
Where is easy to reach?
How can the army be supplied?
Where are the best communication routes for retreat or advance?
Would the local population be friendly or hostile?

Taking this combination of factors on board, we main gain a better insight to the battle location.

Co-ordinating the attack

The 'Anglo-Saxon Chronicle' makes it clear that the Dublin contingent arrived in English territory by sea, however it is less clear how the Northern British forces arrived. Twelfth century sources give more detail, but their information may be questioned. John of Worcester indicates that Constantine's forces arrived and fled by ship. Henry of Huntingdon stated that the 'Danes of England' joined the Scottish army, which could suggest that Constantine's forces travelled overland and collected Northumbrian allies en route. Dave Capener has pointed out that logistically it would have been harder for the northern forces to travel by land than sea and has suggested that the fleets of the coalition may have gathered together in the Irish Sea before attacking Athelstan's kingdom. There are few historical sources for Northern Britain in this period, but it would be surprising if Alba and Strathclyde did not have a naval force, and the Hebrides and Isle of Man which may have joined the coalition would certainly have had ships at their disposal. Some light is cast on military organisation by *Míniugud Senchusa fer nAlban* ('An explanation of the history of the men of Alba') which is part foundation legend and part military census. It was compiled in the tenth century from seventh

[46] Dodgson, *Place-names of Cheshire*, IV.231, 236.
[47] Dodgson, *Place-names of Cheshire*, IV.244.
[48] Dodgson, *Place-names of Cheshire*, IV.255.

of eighth century materials and it records military levies for terrestrial and maritime warfare along the western seaboard of Scotland. As naval warfare became increasingly important during the Viking Age one might expect the kingdoms of North Britain to have access to ships. If forces from North Britain did travel via land, they may have relied on a friendly reception in parts of Northumbria, but it would pose challenges to meeting a fleet arriving from another location at the right time and place. The movement of the land army would be much slower than could be achieved by ships at sea. Whether the forces gathered at sea first, or met by land at an agreed time, the preparations for the invasion of 937 required messengers and co-operation between the different coalition forces.

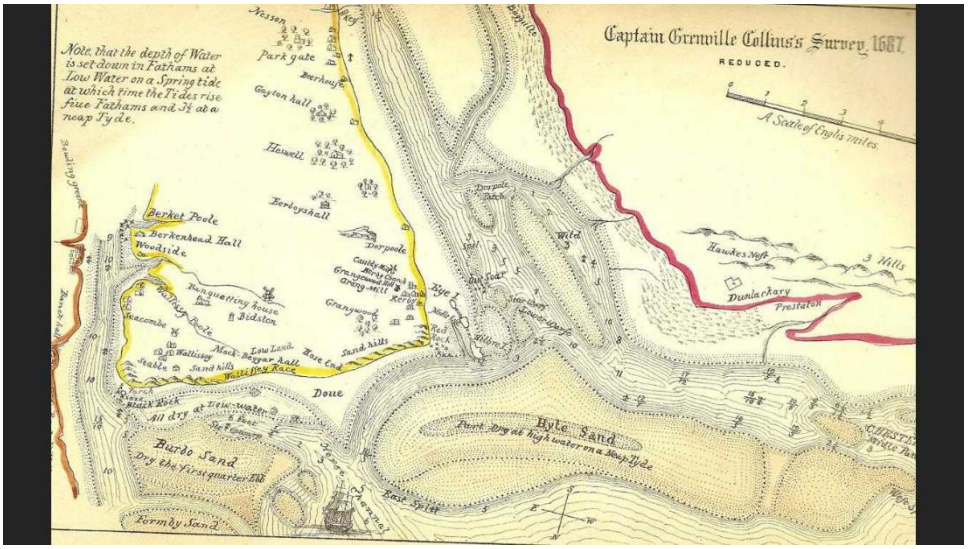
Table of data from Griffiths, *Art of Viking War*, p. 103: The (notional) ergonomics of different forms of transport

	Average miles per (good) day	Number needed to move a ton:		Daily fuel needed per ton moved (in lb)	
		Men	Horses	For men	For horses
Men on Foot	15	50	-	150	-
Driven Horses	15	10	20	30	200
Ridden Horses	30	10	30	30	300
Carts	12	6	12	18	120
Warships	120	5-10	-	15-30	-
Cargo boats	120	1	-	3	-

<u>Where is easy to reach?</u>

Given that the polities of Dublin and Strathclyde are based around the western seaways of Britain it would make sense that the battle was fought somewhere near the Irish Sea coast. If the aim was simply to attack the nearest part of English territory, it would have made sense for Brunanburh to be fought in Northumbrian territory as some of the rival theories suggest. However, if there were Northumbrians supporting the viking/northern side in the conflict (which seems plausible) they would have wished to avoid Athelstan's army wreaking havoc through Northumbrian territory as they travelled to meet rival troops. The aim may have been to strike near the heart of Athelstan's kingdom, not at the northern border of Northumbria, but near its southern border on the River Mersey. It seems probable that the aim of the invading force was not to take over all Athelstan's territories (to which they held no legitimate claim), but rather to restore the authority of the Dublin dynasty of Ívarr over Northumbria. If that was so, had they won the battle of Brunanburh, a logical route would have been to seize Chester and ravage the margins of Mercian territory before using the Roman road network to make a victorious march on York, capital of Northumbria, in order to enthrone Olaf Guthfrithsson as king. For its accessibility by sea the Wirral would have been easy to reach for fleets from Ireland and Northern Britain.

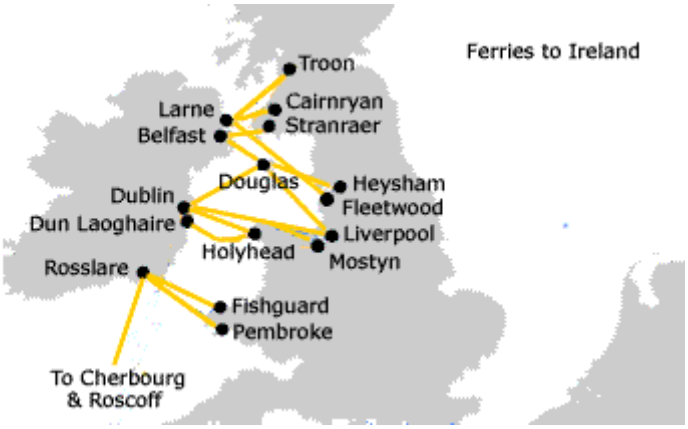
The map below shows the maritime approaches to Wirral in the seventeenth century. The coastal topography has changed over time but the map illustrates access to the Mersey and Wallasey pool prior to drainage.



Supplying the army

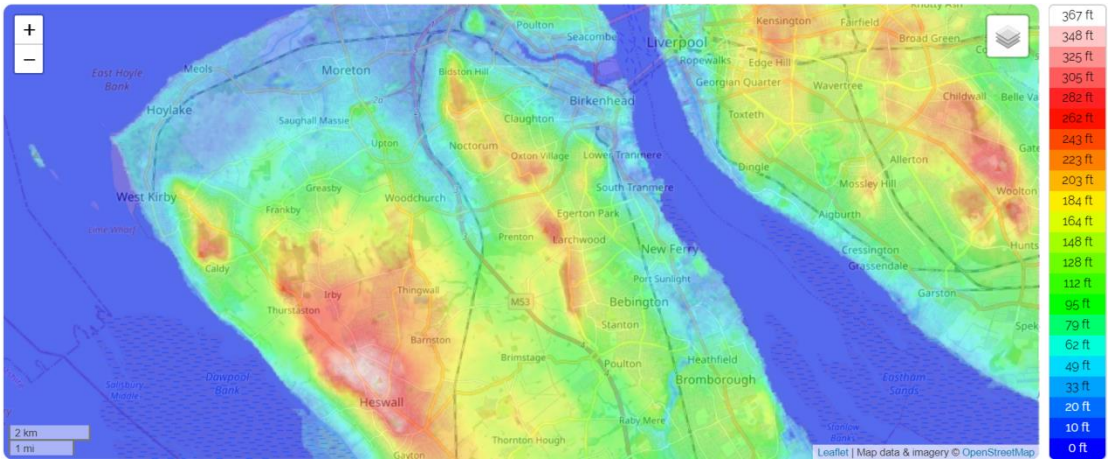
An army of the size of that encountered at Brunanburh could not hope to gain enough supplies by living off the land. Smaller viking armies in Britain had been driven to starvation on previous occasions in 893 and 914. The invaders would have therefore sought a safe location to replenish the needs of their troops. In terms of timing, it is known that the Brunanburh campaign took place after 1 August 937 when the Dubliners defeated their Limerick rivals in Ireland. If they sailed to England in September, they would have benefited from good sailing conditions and equinox tides, and perhaps most importantly, arriving as the harvests had been gathered. This would have maximised supplies both from home and to be captured in Britain to feed the army. It also optimised the devastation they could cause on their enemies if they had been successful, by consuming or destroying food supplies as they travelled in Mercia, depriving the peasantry of food for the winter and cutting the food renders that underpinned the income of the aristocracy.

A location on the west coast of Britain also makes sense from a supply perspective. Dublin and Chester were the wealthiest ports in the Irish Sea region in this period with a regular trade between them, taking advantage of a well-established sailing route along the north Welsh coast and minimising the dangers of sailing across a large stretch of the Irish Sea. The route from the Wirral to Dublin is still in use today as optimum sailing routes have not changed much over the centuries. An army meeting on the Wirral would have a secure and efficient maritime supply line from Dublin and other locations around the Irish Sea to meet their needs before battle but also to equip the army for its onward campaign had it been successful.



Communication routes for retreat and advance

The Wirral is an ideal defensive position for an army arriving by sea. It is surrounded on three sides by water, and thus the only landward route for attack is from the east. If ships were moored at Wallasey Pool or Bromborough Pool, as suggested by Ann Anderson, this would have been a sheltered body of water surrounded by marshy land which would be difficult to assail.[49] A smaller force could have remained by the ships. Given the proposed size of the invading fleet, and the need to keep the ships well defended, Wallasey Pool is considered by Dave Capener the most likely site for mooring the invasion fleet[50]. South of the pool there is a natural ridge running south from Bidston Hill to the edge of Brackenwood Golf Course. This would have offered a dry route for an army to travel with commanding views over the neighbouring countryside, as shown on the altitude map below.[51]



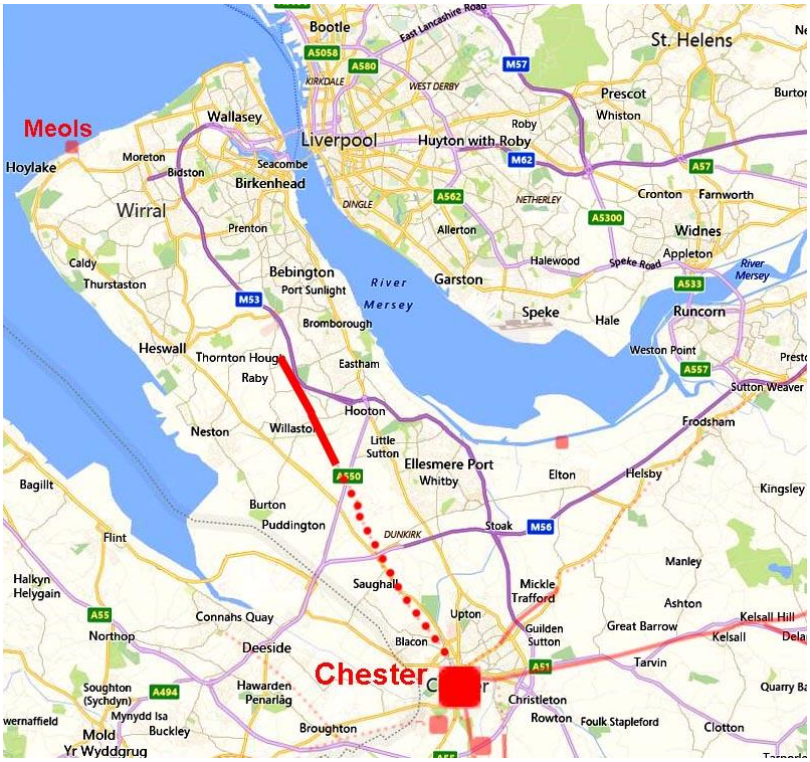
There is a debate whether the invading army were heading directly to Chester and were intercepted by English defenders leading to the Battle of Brunanburh. This idea has been developed by Dave Capener. However, I think it more likely the invading force camped at the southern edge of this ridge near Bromborough, where they could hold a strong defensive position with a line of retreat back to their ships, and waited for the English forces to come and attack them from the lower ground. There are reasons why holding back on an immediate attack on Chester might be a wise strategy.

Vikings had tried and failed to take Chester on two previous occasions. The first was in 893 when the combined viking army of East Anglia and Northumbria came to Chester pursued by the forces of Alfred

[49] Anderson, *Story of Bromborough*, cited Harding, *Ingimund's Saga,* pp. 122-23.
[50] Capener, *Brunanburh Battlefield Assessment*.
[51] Image supplied by topographic-map.com https://en-gb.topographic-map.com/maps/k3qw/Prenton-Brook/

the Great and occupied the fortification. However, they failed to hold Chester as Alfred's army killed anyone outside the walls, besieged the settlement for two days, burned fields and drove cattle away from the surrounding area so that the army was starved out and moved to Wales.[52] Later, according to the 'Fragmentary Annals of Ireland' vikings who had been granted land by the Mercian rulers (probably in the Wirral) attacked Chester around 906 AD. but failed due to a spirited defence by the townspeople and division among the troops. After that the walls of Chester were re-fortified, as suggested by the 'Anglo-Saxon Chronicle' in 907: 'Chester was restored'. This would have made the town more impregnable. Olaf and Constantine's army therefore risked a similar failure if they headed straight to Chester, if the walls could not be breached immediately, a siege situation would leave the invading army in a vulnerable position in low lying land outside the walls where they could be encircled or attacked by an English army sent to relieve the town. Even if they captured the fortress, an English army could besiege and starve them out eventually. In any case, if the invaders had wanted to take Chester straight away, it would make sense to sail their fleet up the River Dee, rather than leaving their ships at the tip of the Wirral and traveling a long way by foot.

While any plan is speculative, if Olaf and Constantine could draw English troops into the Wirral peninsular, surrounded as it is on three sides by water, they could predict the line of English advance and force the defending army to fight from a disadvantageous lowland position. Once the English army had been defeated, it was unlikely that Chester could have put up much resistance to a victorious invading army arriving at their gates, and the English army would have been in tatters and less able to attack or besiege the invaders. This would have paved the way to secure Chester as a supply base for the onward movement of the invading army along the Roman road network heading east.[53]



There is evidence for a Roman road running from the heart of the Wirral into Chester. The evidence is not conclusive, but initial exploration suggests that it ran from Chester via Mollington to Willaston.[54] This route

[52] Anglo-Saxon Chronicle A, s.a. 894 [=893].
[53] Image supplied by Roman Roads Research Association http://www.romanroads.org/gazetteer/cheshire/M670.htm
[54] Roman Roads Research Association, http://www.romanroads.org/gazetteer/cheshire/M670.htm; Stagg, 'Searching for a lost Roman road'.

makes sense in light of Willaston's later role as a hundredal centre for the Wirral that there was an established road network to the site. North of Willaston it would seem likely that the road reached the coast at Meols where Roman market activity is recorded, and another branch may have headed towards the River Mersey. There is record in the fourteenth century of a road running from Claughton (Birkenhead) to Chester and this may follow the line of an earlier medieval or even Roman route.[55] The road running south of Bromborough to Chester could have been the route of advance for a victorious viking-Scottish army. Having secured Chester as an important fortress, the army could have taken the Roman road system to York in order to regain Northumbria for Olaf Guthfrithsson.

Such a scenario is of course speculative. The invading army were defeated at Brunanburh. According to the 'Anglo-Saxon Chronicle', Olaf fled first with a small body of men, and then other forces fled back to their ships. Given that the Hiberno-Scandinavians were able to claim Northumbria two years after the defeat at Brunanburh, it may be that the retreat was more successful than the 'Anglo-Saxon Chronicle' poem suggests, without too much loss of life of resources. The viking army could have retreated the way they came back to their ships, with English forces in pursuit, but they were able to get away effectively by sea. There is no account of the English capturing or destroying the enemy fleet which one might imagine they would have bragged about had it happened. It appears that the invaders planned a good route for retreat if the battle failed and had a good plan for advance if they had succeeded.

Would the local population be friendly or hostile?

In 1957 Dodgson advanced the argument that Brunanburh was fought on the Wirral based on place-name evidence, not only linking it with the name Bromborough, but arguing that the cluster of Old Norse place-names in the Wirral indicates that the local population may have been sympathetic to an invasion force led by a viking king.[56] It is possible that there was a common language and interests shared between people of northern Wirral and those of Dublin. Not least the area was economically tied to the Irish Sea and trade with Dublin must have been a significant part of the local economy. Viking Age finds from the trading site at Meols attest to links around the Insular seaways.

These western connections meant Chester and the Wirral could be considered a border zone with interests in Wales and across the Irish Sea. There are event hints that the region offered resistance to the imposition of Wessex control during the reign of Edward the Elder more than a decade before Brunanburh. In 920 Sitric king of Dublin landed in Cheshire and attacked Davenport before travelling to York. According to William of Malmesbury, writing in the twelfth century, Edward died after defeating a rebellion in Chester in 924. His death at Farndon (possible Farndon in Cheshire) is recorded in the C and D recensions of the 'Anglo-Saxon Chronicle'.

Bromborough lay near the southern boundary of what appears to have been a Scandinavianised administrative unit with its meeting place at Thingwall and southern boundary at Raby. It would certainly be better for an army to travel through and camp within friendly rather than hostile territory and Olaf may have calculated on local support. He may have also hoped to recruit allies from neighbouring North Wales to oppose the English, whether before the battle or after a hoped-for victory which would have placed him in a stronger position to win friends and allies.

For the strategic reasons outlined above the Wirral makes good sense as a place for Olaf and Constantine to launch an invasion of Mercia with the goal to win back for the Hiberno-Scandinavian kings of Dublin control over Northumbria.

[55] Dodgson, *Place Names of Cheshire*, IV. 198, 202, 232, 319.
[56] Dodgson, 'The Background of Brunanburh'.

How big was the Battle of Brunanburh?

The Battle of Brunanburh was a great battle by the standards of the time, but contemporary accounts of the battle do not give much detail about the numbers who fought there. The poem in the 'Anglo-Saxon Chronicle' reports 'countless' died. Aethelweard, who wrote his chronicle around four decades after the battle called it 'the great war'. It is only later, and potentially anachronistic sources, which cite actual numbers.

The *Historia Regum,* a compilation attributed to Symeon of Durham, claims that Olaf of Dublin came with 615 ships. This reference to Brunanburh is in a section of the text which may date to the late eleventh century and which includes tenth century material. As a non-contemporary source, we might nevertheless question its validity. The reference to 615 ships is also found in *Libellus de Exordio* which was written in the early twelfth century by Symeon of Durham. The wording may imply that this fleet included the combined force of Olaf and his allies 'qui dc. et xv. nauibus aduenerat, secum habens auxilia regum prefatorum Scottorum scilicet et Cumbrorum' (who came with 615 ships, having with him the help of the aforesaid Scots and Cumbrians). A viking warship of the tenth century might hold 30-45 men but such a large fleet would comprise ships of different sizes and space would also be needed for supplies and horses may even have been included for transport. Guessing an average of around 20 men per ship would yield a figure of 12,300 but not all those who travelled would have fought in the ensuing battle. Wherever the ships landed, a force would need to remain with them to protect them. If we can take *Libellus* at face value (a questionable assumption), it would imply a coalition force of around 10,000 enemies of Athelstan at Brunanburh.

Other sources make greater claims for the numbers involved. A poem included in William of Malmesbury's early twelfth century *Gesta Regum Anglorum* claimed that the English brought 100,000 men. The thirteenth century chronicle of Peter de Langtoft seems to have garbled earlier references to 615 ships (in writings linked to Simeon of Durham) to record that the invaders brought 715 ships. The seventeenth century Annals of Clonmacnoise which copied an earlier source records the number of fallen and captured on the losing side of the battle at 34,800, but this evidence is so late it cannot be regarded as reliable. In order to make a realistic assessment of how many fought, we may look at comparative evidence.

Brunanburh was probably smaller than the Battle of Hastings fought over 100 years later. This can be deduced not only by the historical impact of Hastings but also because the power of central governments to raise military forces increased significantly during the eleventh and succeeding centuries. The numbers at Hastings have been researched by various scholars which can highlight the difference between claims and reality in historical sources. William of Poitiers, a contemporary, claimed that 60,000 fought at Hastings, while the twelfth-century historian Wace, claimed a total of 100,000 fought there. The research of a number of military historians estimating numbers from logistics and the character of military levies at the time bring us routinely to figures ranging from 6-20,000 combatants at Hastings.[57] A total around 14-17,000 correlates with recent estimates.[58]

Other evidence which can help evaluate the size of the conflict are other tallies of battle dead and fleet sizes found in contemporary records. The following tables give this data for the ninth and tenth centuries from the Irish 'Annals of Ulster' and the 'Anglo-Saxon Chronicle' which are regarded among the most reliable primary sources for this period. The texts have different emphases: Irish chronicles tend to more interested in listing the number of dead in warfare, while the 'Anglo-Saxon Chronicle' is more concerned to record fleet sizes. The figures suggest that mortality in the biggest conflicts would be in the

[57] Brown, *Normans,* p. 130; Beeler, *Warfare*, pp. 12, 16; Brooke, *From Alfred*, p. 88; Wheeler, 'The Battle', p. 133.
[58] Hill, *Anglo-Saxons;* Capener, *Brunanburh,* pp. 12, 25.

order of 1000 or more, while the biggest fleets would be in the order of 200-350 ships. Of course. there is danger that sources will exaggerate the number of enemies killed in battle or the size of an invading fleet.

Year	Number	Year	Number	Year	Number
806 (A)	68	866 (B)	240	948 (B)	1600 die or capt
837 (B)	120	867 (B)	100 +	950 (B)	2000
847 (B)	1200	869 (A)	1000 die or capt	951 (A)	3000 capt
848 (B)	700	895 (A)	710 capt	970 (A)	350
848 (B)	200	914 (A)	45	986 (B)	140
848 (B)	1200 (240)	917 (B)	100	987 (B)	1000
848 (B)	500	926 (B)	200	987 (B)	360
850 (A)	270	933 (B)	200	AVERAGE (B)	731 (not w/ 937)
850 (A)	60	937 (B)	many 1000	AVERAGE (A)	688 die or capt

Nevertheless, there is some consistency in numbers that may reveal the kind of numbers a scribe had in mind when recording a big fleet or battle at the time of writing.

The numbers of enemy dead cannot be easily calculated back to a fighting force. The mortality rate will vary from conflict to conflict. To take a broad modern comparison, in WW1 nearly 14 percent of all combatants died, about 12 percent were permanently disabled and 25 percent were seriously injured. The Middle Ages offered less effective means of killing, but also lacked modern levels of medical support to help save the injured. The 'Annals of Ulster' claims many thousands died at Brunanburh, this could be exaggerated, but suggests a heavy defeat and a bigger force than normal. English sources also suggest the conflict at Brunanburh was exceptional by contemporary standards. Taking these different considerations on board, the combined force of Olaf and his allies falls plausibly between 5-10,000 men, with perhaps similar numbers from the English side. This doesn't fall too wide of the estimate made by Dave Capener at Brunanburh of 6000 men fighting with Olaf and Athelstan fighting with 8000.[59] Assuming that Brunanburh was a smaller battle than Hastings in 1066, for the reasons outlined above, the total number of combatants might be estimated as 10-20,000 men. This would certainly have been a conflict of epic scale to contemporaries.

Annals of Ulster: Deaths and Captives in Conflict - A =attack, B =battle

Annals of Ulster: Fleet Sizes ninth and tenth centuries

[59] Capener, *Brunanburh*, p. 26.

Year	Fleet size
837	120 ships
849	140 ships
852	160 ships
871	200 ships
924	900 crew

Anglo-Saxon Chronicle (A): Deaths and Captives in Conflict - A =attack, B =battle

Year	Number
878	840
897(B)	62 English 120 Danish

Anglo-Saxon Chronicle (A): Fleet sizes

Year	Ships	Year	Ships
833	35	885	16
837	33 (34 C)	893	250 80
840	35	894	100 40
851	350	897	9 vs 6 20
875	7	911	100
877	120	981	7
878	23	993	93
882	4	Average	70

The Battle Site

In 1964 local historian Ann Anderson reported the view that the ridge of high and from Spital to Higher Bebington marked the site of the battle.[60] This general location for the conflict has been followed by Stephen Harding and more recently Dave Capener.[61] As ex-military, Capener has applied a soldier's eye to evaluate possible troop movements and positions. The map below is from his battlefield assessment. On Capener's map, the line of the invading force is shown in orange, the defending force is shown in blue. Capener considers that a Mercian blocking force may have been positioned at Brimstage and that there were flanking positions at Barnston and between Clatterbridge Hospital and Poulton [locational data removed].

As the main conflict at Brunanburh was followed by the pursuit of a retreating army, one might envisage a zone of intense fighting, perhaps between the battle lines laid out by Capener, or closer to the proposed boundary of the Wirral enclave where the Clatterbrook and River Dibbin meet. There would be a more diffuse conflict zone marking the escape route of the invading armies, perhaps along the lowland corridor leading to Wallasey Pool, which has been the suggested location for the invaders to moor their fleet. It must be kept in mind that both the proposed location of the battle and the line of retreat are hypothetical.

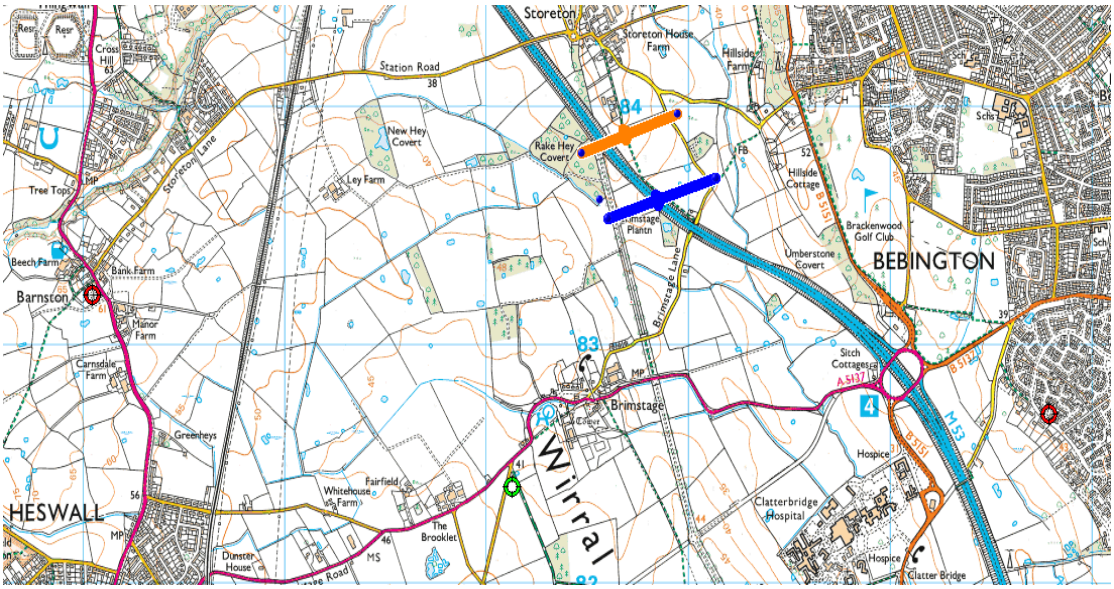


Fig. Map by Dave Capener showing proposed battle-lines (blue and yellow) and proposed sites of flanking camps (red circles)

[locational data removed]

Taking on board the landscape evaluation by Dave Capener and historical report of the battle, quite a broad zone of territory stretching from Heswall to Poulton Hall and then to Prenton would be of potential interest, and this might be considered in light of any planned development in this area. We cannot expect to recover many finds from this area in future, but it may be considered as an area of historic interest.

Conclusion

[60] Anderson, *Story of Bromborough*.
[61] Harding, *Ingimund's Saga*, p. 132; Capener, *Brunanburh Battlefield Assessment*.

Viking Age Wirral was a crossroads of different cultures: Brittonic, English, Gaelic and Scandinavian. Hiberno-Scandinavian settlers arrived in the area in the tenth century. Their impact is evidenced in both place names and archaeology (discussed in Section E below). Wirral was a significant area with a lucrative trading base at Meols and wide-ranging geographic connections. These cultural links help provide a context for the historical and place-name evidence that links the area with the Battle of Brunanburh fought in 937.

One of the main challenges to the theory that Brunanburh was fought near Bromborough is the claim first advanced by the twelfth century historian John of Worcester that the invasion fleet came via the River Humber. By analysing how the Brunanburh narrative developed across a range of sources, it is possible to observe that inaccuracies and legends had crept into the Brunanburh narrative by the twelfth century. For this reason, we should not take John of Worcester's claim at face value, as his claim cannot be traced back to an earlier source. The strongest argument for the battle site is linguistic in that the place name Bromborough can be derived directly from the name Brun(n)anburh recorded in tenth century sources. No other hypothetical location for the conflict can offer such a strong toponymic argument.

The Wirral also makes sense as a battle location from a strategic perspective. It was naturally well defended for an occupying force which arrived by sea, surrounded as it is on three sides by water. A location on the Irish Sea coast is also logical given that a major contingent which fought at Brunanburh came from Dublin. The border location of the Wirral on the edge of the Irish Sea, close to Wales, close to the historic border of Northumbria and on the edge of a Hiberno-Scandinavian enclave in Mercia offered potential advantages to the invading force in terms of gaining supplies and winning local support. Yet the area also offered access to a network of Roman roads penetrating Britain, and perhaps most significantly, providing an overland route to York, historic capital of Northumbria.

The forces which clashed from Brunanburh may have comprised a total of ten to twenty thousand men. That was a great number by contemporary standards and could mean that the battle played out across a fairly wide area. From analysis of the topography of the Wirral, a likely zone of conflict has been identified inland from Bromborough. From a historical, linguistic, geographical and strategic perspective the Bromborough area is a very plausible location for the Battle of Brunanburh. The consideration of archaeological evidence strengthens the case even further.

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SECTION D - GEOPHYSICAL SURVEYS – Paul Sherman

Geophysical Survey 1: [locational data removed]

Introduction

This writer's company was requested to carry out an investigation of a section [locational data removed] using Electrical Resistivity Tomography (ERT) to identify a potential anomaly discovered during a previous magnetometry survey. The area of this anomaly was thought by WA to be the location where iron working residues had been previously excavated thus potentially providing evidence of metal working activity on the site. This survey was carried out in order to corroborate the magnetometer survey results and to ascertain as far as possible whether this area showed evidence of any structures in or around the potential metalworking site. The field work was carried out by co director Jim Glenister and LJMU undergraduate student Danielle Munroe who has been on long term work placement with this writer. The following is an extract from the report.

Methodology

A string of connected electrodes was deployed along a straight line, with a pre-determined inter-electrode spacing of 0.5m. With 36 electrodes, each string measured 17.5m in length. Once a set of measurements of ground resistance had been determined for one string, the string was re-deployed and a second set of measurements of resistance made. The individual strings were parallel, and set at 0.5m apart. This process was repeated until an area 17.5m X 3.0m had been covered. Figures 1 to 4 show the arrangement.

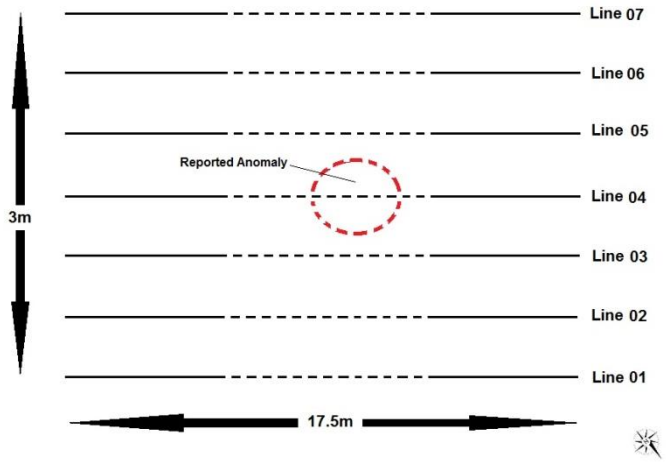


Figure 1

Conclusion

The individual inversion models for the surveys are shown at Figures 6 and 7.

The Double Dipole arrays at lines CF04D50 to CF05D50, shown in Figure 6, do indicate a high resistivity anomaly at the reported position. The depth appears to be up to 0.9m from the surface. Further investigation, by excavation, may reveal the cause.

There does not appear to be any other feature in the area covered.

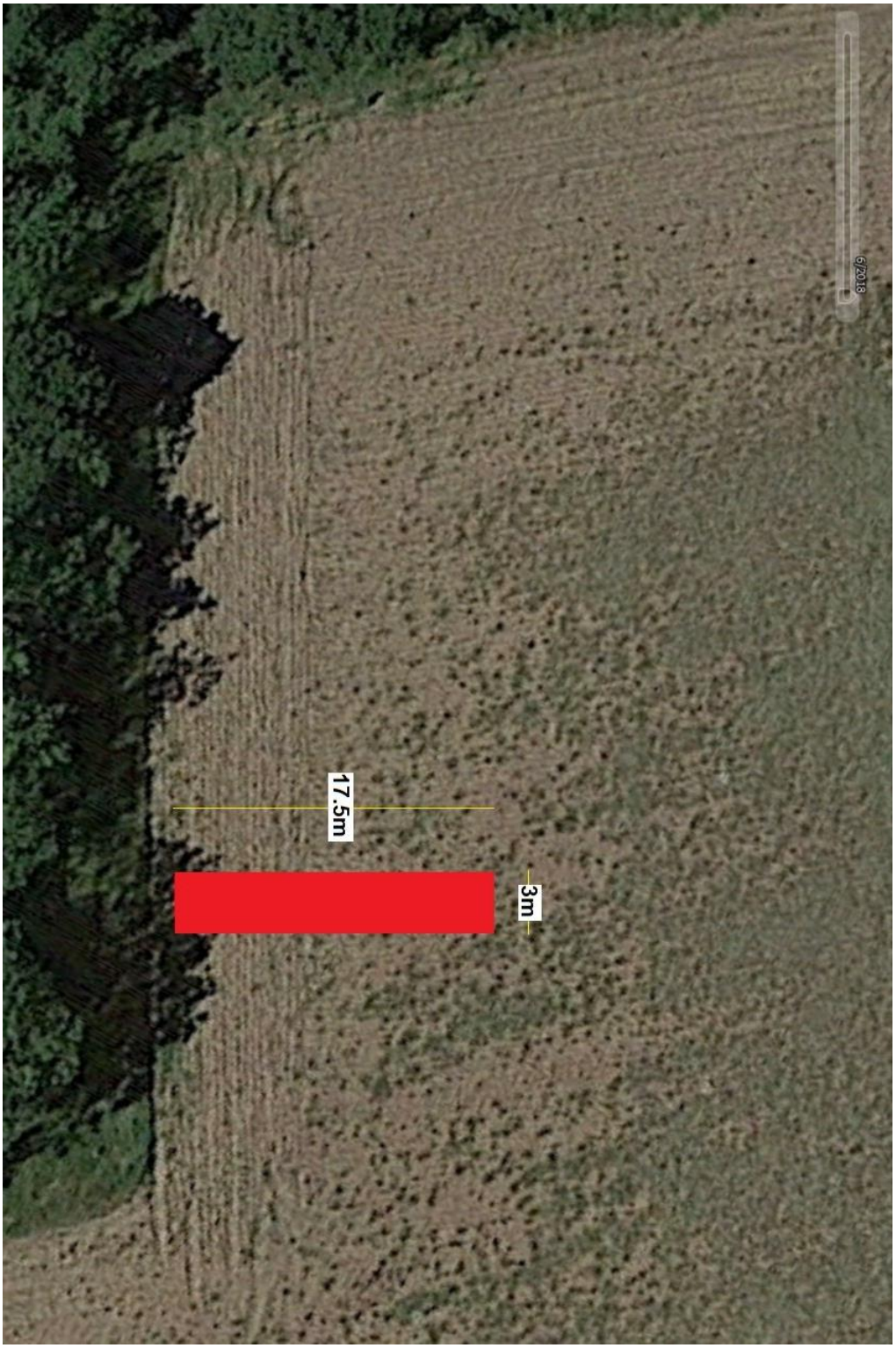
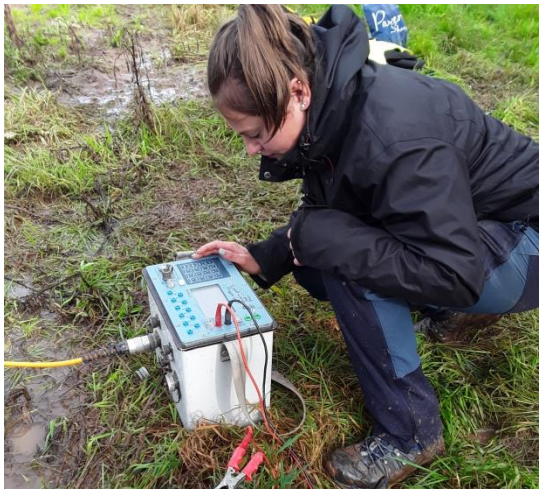
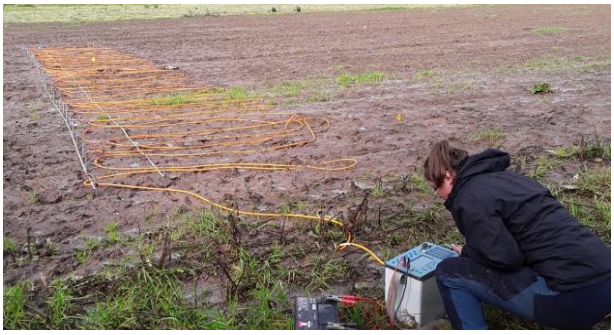


Figure 2 – [locational data removed]

Figure 3 – Electrode Array





Figures 4 & 5 - Equipment in use

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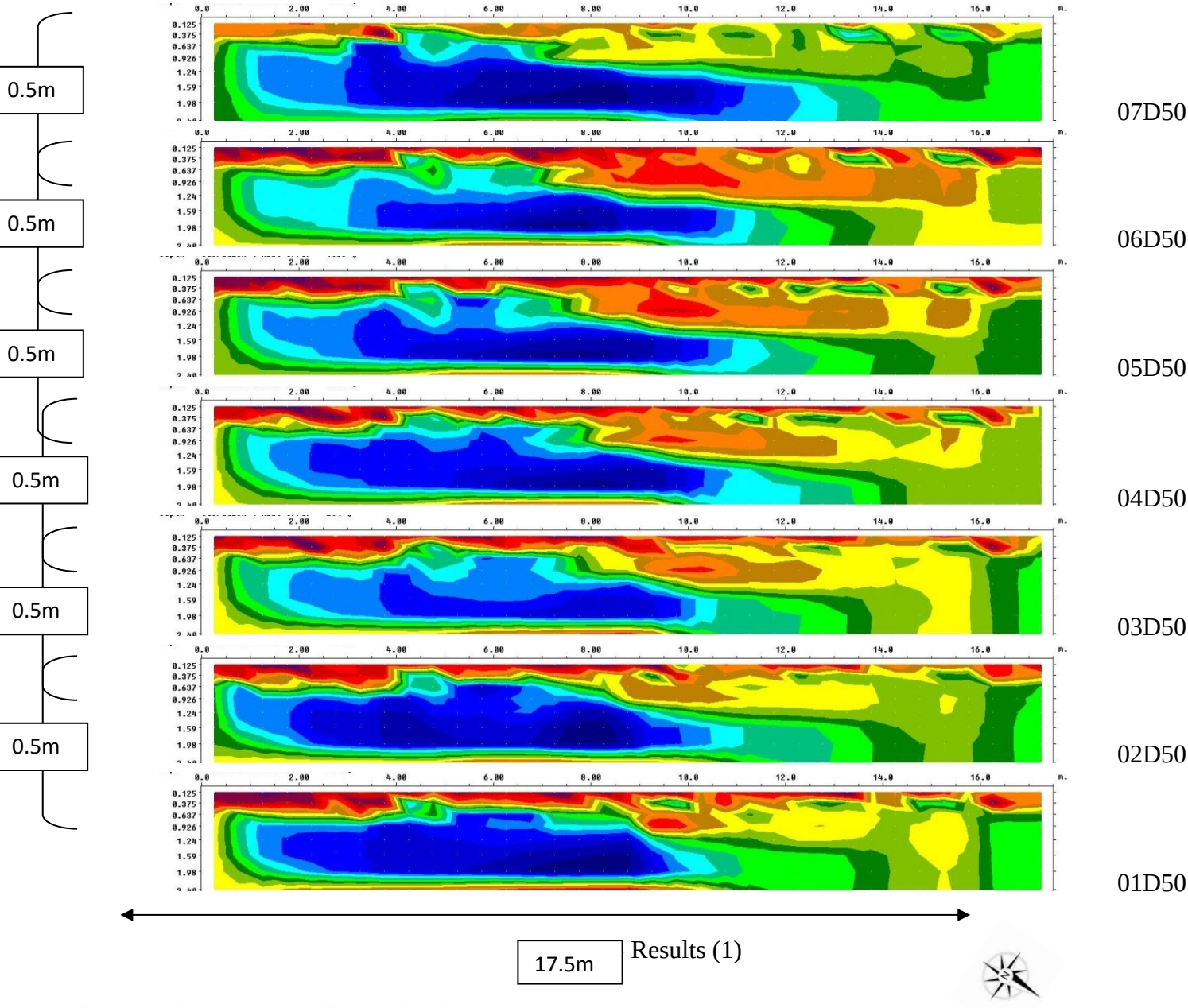
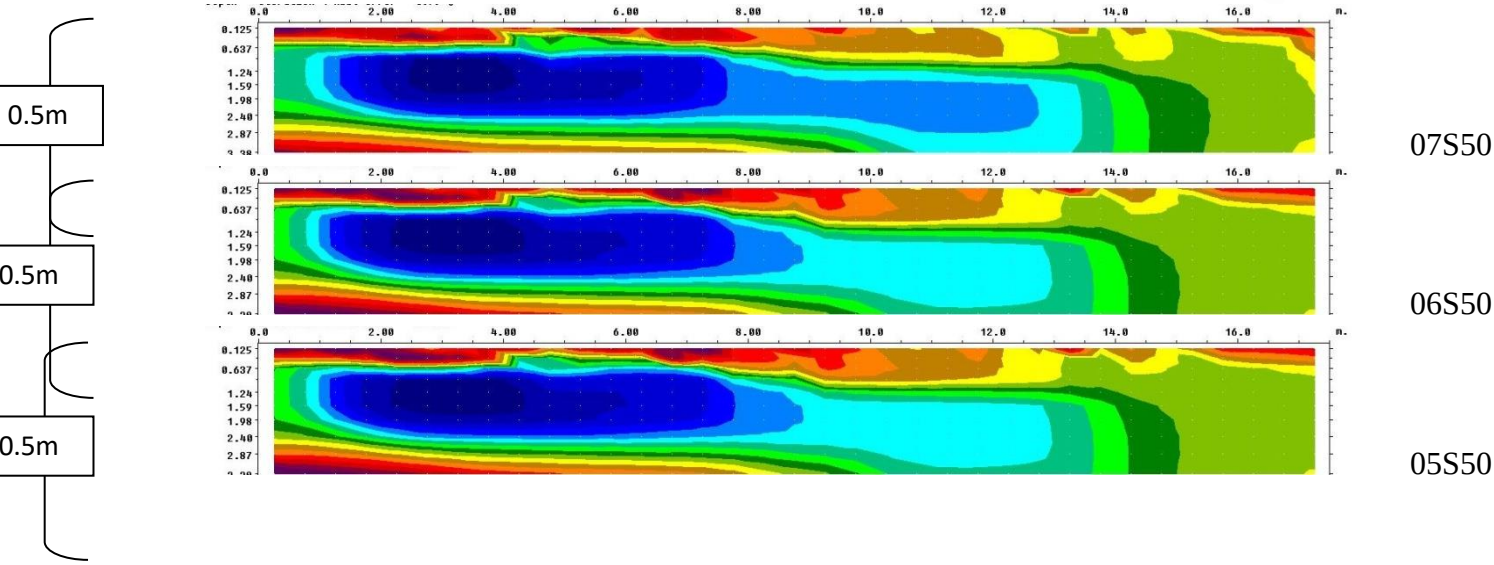
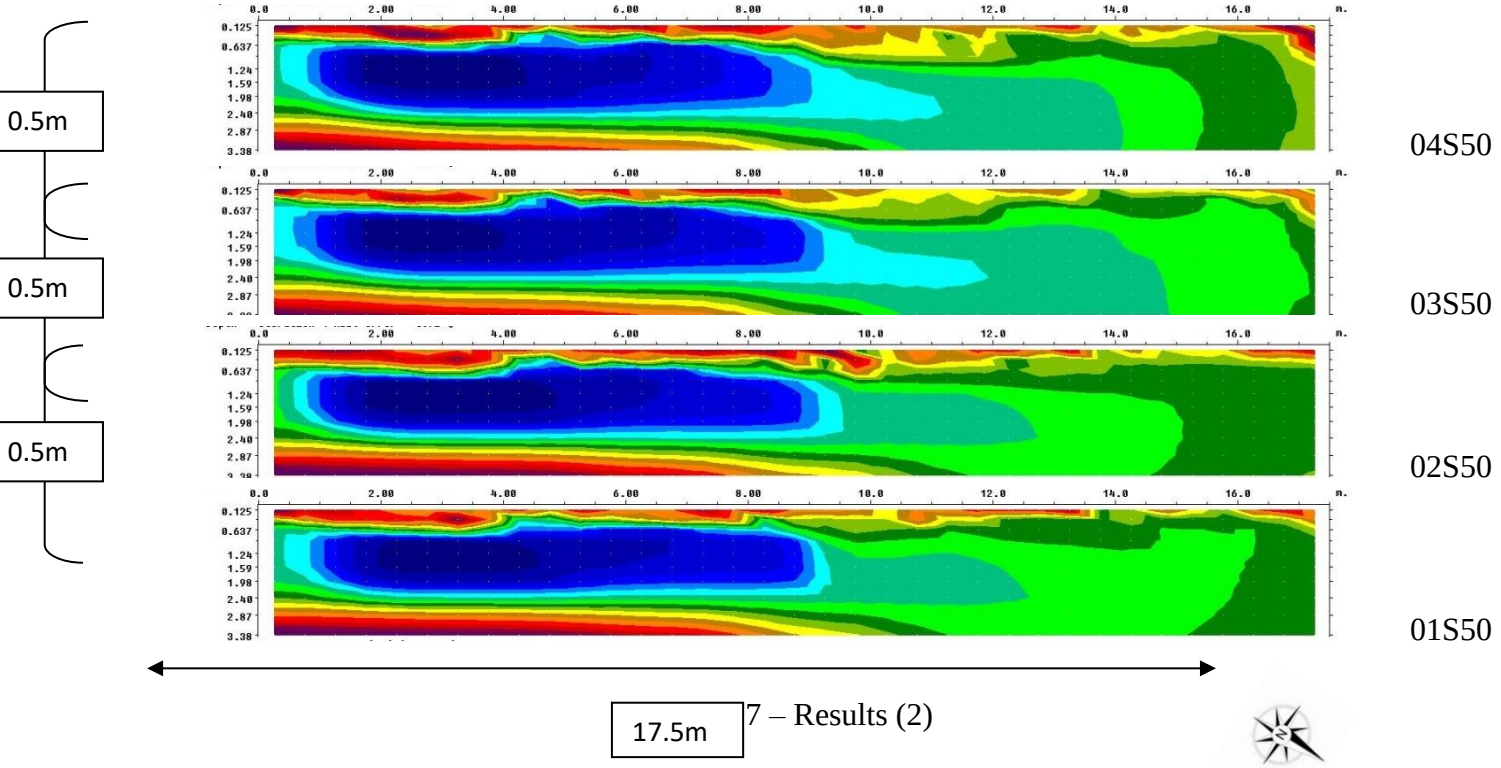
Double Dipole - 36 Electrodes @ 0.5m spacings – Lines @ 0.5m spacing



Results (1)

[locational data removed] – Schlumberger - 36 Electrodes @ 0.5m spacings – Lines @ 0.5m spacing





7 – Results (2)

<u>Geophysical Survey 2</u> [locational data removed]

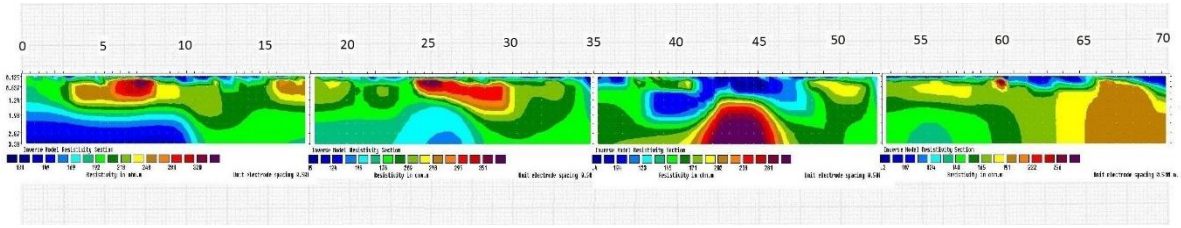
WA members thought that this site was the potential location of a Roman road which if true may have still been in use during the mid 10th century. Unfortunately due to matters beyond our control we were only able to obtain information on this particular location from WA the night before attending site to carry out the survey.

Background

The feature to be investigated, a potential Roman road runs along a present day field boundary, across open agricultural land, crossing a brook along the way. The area chosen to carry out the ERT survey was a line parallel to the brook close to the crossing point.

The ERT string being parallel to the brook would in theory transect the feature at approximately 90 degrees providing a plot of the feature in section. As in the previous survey, the electrode spacing was 0.5m. The survey extended well beyond either side of the area of interest in order to assess the potential feature in the wider context of the surrounding area.

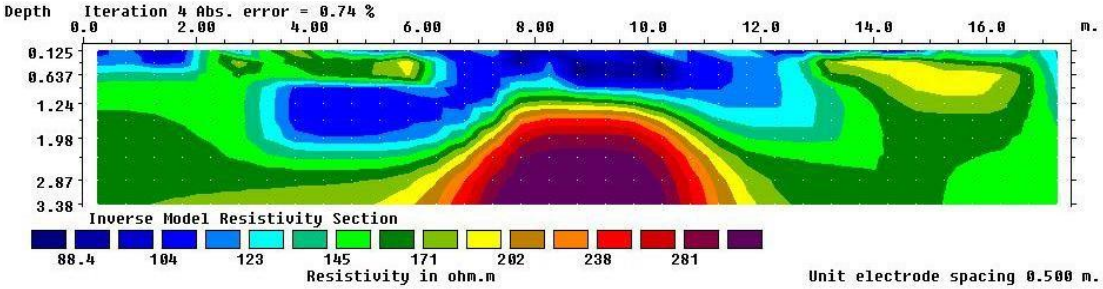
The ERT plot revealed the feature at the 42 - 44m point within string 3 as shown below



ERT plot of 4 x 17.5m strings with the feature shown in the centre of string 3

Interpretation:

The detail of the feature as shown in the plot below reveals that it appears to exceed 3m in width at a depth of 1.24m and widens to c. 6m at a depth of 3.38m.



Conclusion

Based on the results of the ERT survey alone, the dimensions and depth of this feature suggest this not to be a Roman road but a natural feature, a probable glacial deposit. To prove this, the day after the ERT survey was carried out, a trial pit was excavated over the site of the feature. This small excavation was then used as an exercise to train WA members in excavation techniques. Excavation confirmed that the feature indeed comprised naturally deposited sand and gravel.

Another small section was excavated adjacent to the brook where 2 shards of 17th century pot were recovered. It may be plausible to suggest that historically the course of the moraine served as a pathway, especially as at the point it meets the stream, there is evidence of it being used as a crossing point. One WA member recalls seeing stone blocks at this point which may have been part of a former bridge. However, on our visit no such masonry was in evidence. During the survey we examined aerial photographs of the surveyed area and its surroundings and identified a possible section of Roman road in a nearby field.

SECTION E: Physical remains of the Viking Age in Wirral – Clare Downham

There is little historical evidence relating to the history of the Wirral during the ninth and tenth centuries. In 893 the 'Anglo-Saxon Chronicle' records at attempt by vikings based in England to seize Chester but they were driven away. We then hear from an Irish source called the 'Fragmentary Annals of Ireland' that a viking named Ingimund, who had been driven from Dublin in 902, was granted lands near Chester by Aethelflaed, lady of Mercia. Aethelflaed was forced to assume the reins of government during the illness of her husband Aethelred. She would later take over control of Mercia on her husband's death in 911. After her own death in 918 the kingdoms of Mercia and Wessex would be united under the control of her brother Edward the Elder. Aethelflaed was a daughter of King Alfred the Great and there has been much interest in her career in recent years. It is assumed that the grant to Ingimund was lands in the Wirral, this is not unreasonable, but it is unproven.

The 'Fragmentary Annals' is a text preserved in a single seventeenth century manuscript. It is a compilation of earlier materials, some contemporary with the events they record, and some saga-like material of the eleventh century (and potentially later) whose narrative was based on earlier chronicles. The 'Fragmentary Annals' account of Ingimund finds some support in the Welsh Chronicle *Annales Cambriae*. The 'Fragmentary Annals' report that before Ingimund came to Mercia, he was defeated in battle in Wales.[62] This is corroborated by the Welsh text which reports his defeat on Anglesey. It is possible that Aethelflaed's alleged grant to Ingimund can be compared to the account of the grant of Normandy to the viking Rollo in the early tenth century. By settling vikings at the edge of an important river estuary (the River Dee in Mercia and the River Seine in Normandy) they could help defend against further viking incursions.

The main evidence for viking settlement in the Wirral is however in place-names and archaeology.[63] There is a dense cluster of names with Old Norse elements in the northern part of the peninsular that suggest Old Norse was a language spoken in the district for some time. There are a few Gaelic names to which may reflect the present of Hiberno-Scandinavians from Dublin or broader ongoing connections across the Irish Sea in the early Middle Ages. The place-names hint an integration between peoples of diverse origins in the Wirral – Mercian, Welsh, Gaelic and Scandinavian. They also suggest that the area was self-governing under Scandinavian style rule as evidenced by the place-name Thingwall. This refers to an assembly place akin to thing-sites in other areas of Scandinavian influence, including Tynwald Hill on the Isle of Man and Þingvellir in Iceland. The place-names Raby and Raby Mere refer to a boundary settlement, perhaps marking the southern edge of the jurisdiction of the thing-site.

During the tenth century, there were other enclaves of Scandinavian settlement further north along Britain's Irish Sea coast. Just north of the Mersey there is a similar pattern of place-names, with another Thingwall (in West Derby) and the place-name Roby (near Huyton) which comes from the Old Norse words for 'boundary settlement'. Many of the Old Norse place-names in Wirral and further north could have been coined after the initial settlement of vikings, even as late as the twelfth century. This is because Old Norse words persisted in the local dialect and Scandinavian personal names continued to be used locally after the Viking Age. A more reliable guide to Viking Age activity on the Wirral is therefore the evidence of sculpture and archaeological discoveries which date to the tenth and eleventh centuries.

[62] Radnor ed. *The Fragmentary Annals of Ireland*, FA 429.

[63] Much of the evidence alluded to in this section is available via the free smartphone app 'The Viking Age in the NW' produced by Clare Downham at the University of Liverpool with assistance from Rob Philpott and the app development team in 2019.

The most productive site for Viking Age finds on the Wirral is at Meols on the north coast.[64] Due to the erosion of sand banks on the coast, a large number of finds were discovered and recorded from the nineteenth century. These appear to reveal that there was a seasonal beach market at Meols in operation from Roman times until the later Middle Ages. There is a pronounced cluster of artefacts which date to the Viking Age suggesting that the market may have had its heyday in the tenth century. Some of these finds are preserved in museums including the Museum of Liverpool, the Grosvenor Museum and the Williamson Museum, Birkenhead. The finds include metal strap-ends, tags and ring-pins (a type of brooch which worked as a cloak fastener), buckles, ornaments and weaponry. There is also the alleged remains of a viking boat under the patio of the Railway Inn in Meols, however the boat remains underground and has not yet been tested for its date, so this must remain speculative.

Remains of Viking Age buildings in the Wirral have been recovered at Moreton and Irby. The style of the buildings at Irby link to the viking world, but the place-name means 'settlement or farm of the Irish' which may connote the presence of settlers from Dublin.[65] In addition, some isolated archaeological finds have been discovered, these include a mount for a stirrup strap found at Greasby which dates to the eleventh or twelfth centuries, a sherd of Stamford Ware from Bromborough near the church which dates to the tenth or eleventh centuries. At Neston, a ninth-century copper alloy strap-end was discovered by a metal detectorist in 2007. While a Viking Age silver ingot weighing 24.55 grams was found on ploughed land near Ness in 1995.[66] In general, Viking Age finds are not common which highlights the great significance of the site at Meols and also demonstrates why potential tenth century finds recovered by Wirral Archaeology merit further investigation.

There are remains of Viking Age sculpture at several sites in the Wirral.[67] These tend to be in the form of ornamented crosses or burial markers, indicating the wealth and Christian faith of their patron. The style of these monuments show links around the Irish Sea region and the 'St John's Chester School' of ring-headed crosses. At St Barnabas Church in Bromborough at least 15 fragments of pre-Norman sculpture were discovered in 1863. Unfortunately, the bulk of these are missing or destroyed. In 1958 three remaining fragments were joined together with new sandstone components to make a single standing cross which can be viewed in the church yard. Another fragment was rediscovered in 2016. The fragments date to the tenth or eleventh century suggesting that there was an important church on this site around the time of the Battle of Brunanburh. Another church near the purported battle site is St Andrews in Bebington. It is reported that some pre-Norman stonework is included in the south wall of the present church, however this is not recorded in the Historic England listing for the church.[68] A priest is recorded in Bebington in the Domesday book suggesting some form of church was here in the eleventh century. Wirral Archaeology is hoping to undertake further investigation of this site.

From the site of a former church in Overchurch an impressive runic slab or shrine cover was retrieved from a demolished church in Upton. The runes are in Old English and precede viking settlement in the Wirral, but nevertheless suggest a significant church was located here. At Woodchurch the remains of a tenth or eleventh century cross head has been built in to the north wall of the chancel. At Bidston a small piece of sculpture, perhaps misidentified as a 'mini' hogback sculpture has been recovered but it is in private ownership. Other sculptures dating to the tenth and eleventh century are found at West Kirby (most famously the 'hogback' monument in the church but also the collection of materials in the Charles Dawson Brown museum next door). There appears to have been an early church on Hilbre Island and four pieces of sculpture were found here although two have since been lost. The remaining fragments are in the Charles

[64] Griffiths *et al.*, *Meols*
[65] Philpott and Adams, *Irby*; Philpott, 'Viking Age rural settlement'.
[66] Bean, 'Appendix'.
[67] Bailey *et al.*, *Corpus*.
[68] Historic England: Church of St Andrew https://historicengland.org.uk/listing/the-list/list-entry/1075462

Dawson Brown and Grosvenor museums. A fascinating collection of tenth and eleventh century sculptures is on permanent display in the church of St Mary and St Helen in Neston. The five pieces of early date include interlace decoration, knotwork, step-patterns, cable-designs and figurative scenes.

In addition to known archaeological finds, WA questionnaires yielded references to finds which WA members had heard about but which on further investigation were not known to still exist or which were demonstrably not Viking Age. Given the local and international popular interest in vikings there is a tendency to misidentify finds to this period. One example is the reported discovery of a Viking sword from the Heswall foreshore from around 15 years ago, found by local resident Donald McKinnon. Further investigation determined this to be a modern dagger, crudely manufactured of possible Turkish or North African origin.

In sum, further investigation has not yielded additional evidence for a Viking Age battle in the Wirral, although a small number of military items of the Viking Age were recorded from the trading sites Meols (including a possible furnished burial comprising an axe, shield boss, arrowhead and spearhead). Nevertheless, there is a significant body of evidence for viking activity on the Wirral, and there has been growing publicity around this aspect of local heritage in recent years. This makes the finds of Wirral Archaeology of potential interest to a wider audience. The number of Viking Age finds which we have seen as part of this feasibility study is slight, but there would be merit in having a specialist look over the considerable number of finds which were not included in the feasibility study.

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SECTION F: Comparative sites – Clare Downham

Due to the COVID-19 lockdown and ongoing restrictions it has not been possible to access comparable datasets for this project. Discoveries from a site in West Lancashire (Sherman, in progress) are mentioned briefly in the section on arrowheads by Paul Sherman (Section A) where almost identical arrowheads to the well preserved WA example have been recovered, while the archaeology of viking camps in England is alluded to by Robert Philpott in finds discussion (Section G). It was hoped that a corpus of Viking Age material might be compared to the finds from Fulford near York where work has been done to identify the site of the battle which took place on 20th September 1066, at the end of the Viking Age.

Of particular relevance appeared to be the evidence of metalworking at Fulford which has been interpreted as a post-battle re-processing site. This has influenced WA's interpretation of the metalworking material recovered at [locational data removed]. Nevertheless, the scope of the metalworking material at [locational data removed] suggests that metalworking activity was taking place at different times, and smelting activity was taking place as well as smithing. Metal smelting requires the transport of ore from the source to the processing site, and a large amount of fuel. This goes against the theory that the site was used for recycling metal plundered from a battle-field for only a short space of time after a conflict was over, thus limiting the value of the Fulford comparison.

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SECTION G: Do the works undertaken so far indicate that a major tenth century battle, potentially Brunanburh, took place in central Wirral – Rob Philpott

Wirral Archaeology's claim that part of the finds assemblage represents material from the Battle of Brunanburh raises two key questions. Are any of the finds certainly of early medieval date? If so, can they reasonably support the claim that they are associated to the Battle of Brunanburh? To answer these questions we need to consider what a battlefield assemblage might look like and how it would compare with the present assemblage; and whether the finds present in Wirral form a significant concentration or are simply part of a background scatter of finds which could be associated with rural settlement.

To take the last point first, it is necessary to know the general level of finds – how common are early medieval finds within the historic county of Cheshire and does the WA assemblage stand out at all?

The wider material cultural context for this assemblage.

Early medieval finds of any kind are scarce in the lowland North West of England as a whole. Two sites that have produced significant quantities of early medieval material are highly exceptional, for different reasons. One is the re-occupied Roman fortress of Chester (Mason 2007), documented as a burh or fortified settlement in AD 907 though occupied before that, with a recorded mint. The other is the port and beach market at Meols on the North Wirral coast (Griffiths 2010; Griffiths, Philpott and Egan 2007).

The scarcity of early medieval finds in the North West more widely can be demonstrated by several studies. A recent study by the writer of the contribution made by metal-detector surveys to developer-led archaeology in Cheshire (Philpott 2018). This was of particular relevance to the present question as it took a sample of about 20 metal-detector surveys within Cheshire and attempted to assess their value for recovery of archaeological information. Almost all the surveys were systematically walked on transects, in a methodology familiar from other archaeological survey techniques such as fieldwalking. The result was that findspots could be closely located and distributions truly reflected a sample of the material available and of its position within the field. Thus, the archaeologists could be confident of the patterns derived from the fieldwork. An important, if unsurprising, finding of this essentially arbitrary sample was the extent to which assemblages from any given field were heavily dominated by metal finds of post-medieval and modern date. Later medieval and Romano-British finds were scarce, and in the case of the Roman finds they could in some cases be attributed to nearby rural settlements. Least common of all were diagnostic finds of early medieval date which were completely absent from all but one site. The exception was a site where two finds might belong to the early medieval period and these were recognised only in re-examination of the evidence, not by the archaeologists at the time. Thus, the general level of early medieval metal finds distributed across the landscape is extremely low.

A second source of evidence for the density and distribution of finds of early medieval date is the Portable Antiquities Scheme (PAS). A subset of the finds was plotted by the VASLE project based at the University of York which plotted early medieval finds to 2006. The scarcity can be demonstrated by the VASLE website which utilised the Portable Antiquities Scheme's findspots to plot distributions of early medieval finds (Richards and Naylor 2008). Although now very out of date, and the PAS database contains many hundreds of thousands more finds overall, the basic pattern remains sound. The Portable Antiquities Scheme

has recorded finds in the NW lowland region including Cheshire and Merseyside since 1996. Most finds come from rural contexts, fields and most have been recovered by metal-detectorists.

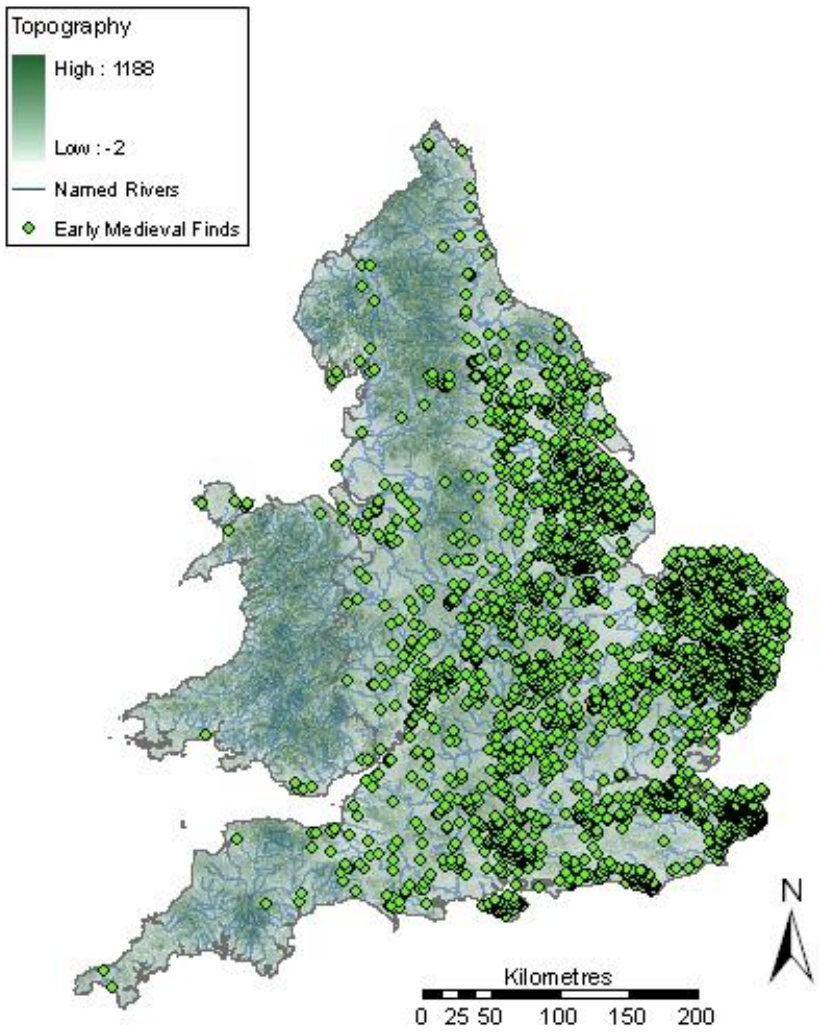

Fig. 2: Distribution of early medieval finds in England and Wales from Portable Antiquities Scheme (plotted by the VASLE project: Richards and Naylor 2008)

Very few settlement sites have been excavated in the region as they are difficult to recognise due to the scarcity of diagnostic artefacts, e.g. Tatton in east Cheshire (Higham 2004). The writer has excavated three early medieval rural settlement sites in the region, two in Wirral (Irby and Moreton) and one in Merseyside north of the Mersey (Court Farm, Halewood; unpublished, formerly south-west Lancashire). All were recognised through the presence (or suspected presence) of finds and occupation deposits of different date. Two were Romano-British rural sites, on which early medieval occupation was subsequently found; the third (Moreton, Wirral) was on the documented site of a medieval chapel. None was investigated primarily as an early medieval site and the quantity of datable diagnostic early medieval finds was extremely low on all sites. The presence of early medieval occupation was therefore unsuspected in each case (Philpott 2015).

The overwhelming evidence from these various sources is that in general across the Cheshire landscape early medieval finds are very scarce and metal detecting routinely does not produce more than very low levels of durable material culture. Concentrations of metalwork and other finds are scarce and are confined to particular kinds of settlement or activity. There is not a consistent background scatter of early medieval finds.

In the absence of a recorded settlement such as a burh, or a port such as Meols, such a concentration of early medieval finds is highly unusual. The military character of some of the material is also distinctive, albeit small in number. There are gaming pieces and lead weights, characteristic of Viking winter camps in the north-east. A substantial proportion of the finds are iron tools and waste from metalworking, including partly shaped blanks and a quantity of raw material – rectangular billets of wrought iron, which is the partially worked iron material for objects, blanks, the partly shaped objects, and plate/strips, also partly worked or unfinished iron objects. Much of this material is not inherently datable without a context but would fit into a medieval timeframe.

The assemblage discussed above clearly meets the requirements of an unusual concentration of early medieval finds, certainly in a regional context. This is enhanced if it is accepted that some of the undiagnostic or material more broadly defined as 'medieval' might reasonably be considered to be early medieval in the light of the presence of other corroborative material from that narrower date range.

Does the assemblage represent the Battle of Brunanburh?

Do the Wirral Archaeology finds represent the Battle of Brunanburh? If so, what does the distribution of finds tell us about the location of the battle? These questions require consideration in the light of the nature of warfare in the early medieval period. Of fundamental importance is the way in which any battle involved several distinct stages: preparation for battle by both armies at short-lived, rapidly established camps; the battle itself, which at Brunanburh took place over a single day; and the immediate aftermath for the victors and vanquished.

What different stages did the battle in its broadest sense involve and what is the archaeological signature from each of these stages likely to look like?

The Battlefield itself, and before and after

The obvious focus of Brunanburh is the field of battle itself. This was not necessarily a closely defined or neatly bounded area, as the main pitched battle ground itself could potentially cover an extensive area. 'The nature of warfare is such that boundaries to an area of conflict are rarely precise' (Historic England 2017, 9), but for the purposes of registration of a battle location, Historic England notes that it must be securely identified, 'the place where the troops drew up, deployed and fought while in battle must be established beyond reasonable doubt' (HE 2017, 9).

The action was not confined to the main battlefield. Events beyond the field of engagement were important elements of the course and outcome of the battle. 'It was typically in the pursuit and 'execution', after battle formations had collapsed, that the greatest numbers of troops were killed, capture or executed' (HE 2017, 9). The territory crossed by the retreating army pursued by the victors potentially extended like tentacles out from the main field of battle. In the case of the Battle of Brunanburh, one arm of the tentacle might be to Dingesmere, across which the defeated Olaf and his surviving companions returned to Ireland, although the location of this coastal or estuarine 'marsh of the thing' (Cavill 2011) is unknown, despite much discussion and conjecture by Harding and others (e.g. Harding 2011, 358-362: Heswall Point, Heswall to Ness, Meols, and Bromborough have all been suggested).

Viking Camps

Another important dimension of the battle is the camps established before and after the battle, and one which may have the greatest potential to produce archaeological evidence.

A study of the Viking winter camps in England may yield clues as to the kind of assemblage which might be expected for the pre- and post-battle camps.

Recent research has established the location of a number of winter camps associated with the viking Great Army, the Scandinavian host which overwintered in England between 865 and 878. Hadley and Richards argue that they have identified an artefactual 'signature' for the Great Army camps (Hadley and Richards 2018, 3). They note that the 'artefacts recovered from Torksey and Aldwark do not represent a typical settlement assemblage. The finds reflect instead the specialist nature of activities carried out whilst the army, and its followers, overwintered. These include trading, using both bullion and coins, metal processing and manufacture, including melting down looted objects and transforming them into ingots; the repair of ships and weapons, gambling and gaming' (Hadley and Richards 2018, 2). These activities are represented by six categories of find:

1. Hack metal, mostly of silver; 2. Lead and copper-alloy weights, 3. Stycas (Northumbrian coins), 4) Anglo-Saxon pennies, which are outside their primary area of circulation, and often pierced or cut; 5. Anglo-Saxon and Irish dress accessories and mounts. 6. Lead gaming pieces (Hadley and Richards 2018, 3).

Another aspect of the Viking winter camps is their size. Torksey measures *c*. 55ha in extent, while Aldwark is *c*. 31 ha, although Repton by contrast was a D-shaped enclosure only 0.4ha in area (Hadley and Richards 2016, 26-27).

Potential Signature for Brunanburh Camps

Unlike the Viking winter camps of the great army such as Torksey (Hadley and Richards 2018) and Aldwark (Williams 2020) which saw temporary settlement over several months of the year, it is likely that the Brunanburh camps, of both Athelstan (Anglo-Saxon) and the confederation of forces against him, were short-lived and transient. Livingston (2011) argues that the allied armies of northern Scots under Constantine, Hiberno-Norse under Olaf and Britons of Owain (2011, 19) were gathered in haste, and probably launched a surprise invasion. They were harrying Athelstan's domain in Lancashire and Cheshire plains at harvest (2011, 18) ; whether they gathered in Wirral or arrived after a march from elsewhere, 'we can be reasonably certain that the decision to fight on that peninsula was their own. Athelstan was playing catch-up one way or another and the Wirral could easily have been view from Olaf's perspective as the closest thing to 'home field' he was going to find in Athelstan's territories' (2011, 19).

The historical data suggest that we might anticipate certain differences from battle camps and the known Viking winter camps in England. Just as the winter camp finds do not reflect 'typical settlement assemblages' (Hadley and Richards 2018, 2), so the short-lived camps of the battle might be expected to produce only a subset of the artefacts present at the winter camps. It is likely that they were dominated by

weapons preparation and repair, and leisure activities, while trading and reduction of looted items to bullion are far less likely. In terms of the activities practised there which might leave an archaeological signature, it might be anticipated that both sides were focused on the preparation for the battle, while only the victors, Athelstan's army, would have the luxury of establishing or re-occupying their camp in the aftermath, the enemy having been defeated and forced to flee. It is reasonable to assume that the battle camps would also be considerably smaller than the larger winter camps as they were erected at some speed, while the immediate need to be defensible was of paramount importance. We are therefore looking for short-lived occupation, but one which brought large numbers of men to a small area of the landscape for violent conflict, followed by rapid violent dispersal of some and short-term occupation by others.

Camp location

Outside the scope of this part of the study but relevant to the question of the battle location are the considerations of topography. Proximity to land and riverine/estuarine routes for ease of transport was important in terms of the location. Roman roads play an important role in battle locations as well as in siting winter camps as they were the main reliable land routes to allow the rapid movement of forces. The Viking force of Olaf arrived by sea, and moored his ships in an uncertain location – Higham suggests in the Ribble estuary, others more recently have suggested Dingesmere was the name given to the Dee shore between Ness and Heswall Point (e.g. Harding 2011, 359-362) and Wallasey Pool.

The Roman road alignment is well attested from Chester as far as Street Hey, Willaston, and its destination is usually seen at the Roman port at Meols. A Roman road alignment has been claimed in Storeton by WA. The Storeton alignment is entirely plausible, and has the support of alignments visible as field boundaries and other roads in the 19th century. However, the various claims made by WA and others are not supported by properly documented evidence or excavation in the public domain to demonstrate the continuation of the line. Without publication of evidence according to conventional archaeological standards, it is impossible to evaluate the claims for road alignments and they remain unverified hearsay.

In addition, features such as mass graves are also seen as important elements in understanding the battle. Although various potential sites of mass burial or unexplained skeletons outside ecclesiastical contexts have been identified in Wirral, at places such as St Andrew's Bebington (Sulley 1889, 307; Cox 1897, 120-1) Storeton Hall, Burton Point, and Brimstage, this lies outside the scope of this report. Careful investigation of these reports might however add valuable evidence towards understanding the aftermath of the battle.

An early medieval battle assemblage?

There is some primary evidence for early medieval activity, which consists of a relatively small number of finds which can be confidently assigned to the early medieval period. They include several gaming pieces, a strapend, and small groups of knives and arrowheads. An important find is the possible rune-inscribed piece of lead. Together these represent what is for the historic county of Cheshire a very significant group of finds.

There is a much larger group of finds, mostly iron, which is probably also of medieval date, but which cannot be narrowed down any more closely in date.

There are some specific and unusual emphases within the material. One field [locational data removed]

has produced very large quantities of ironwork, well in excess of the normal background scatter of losses from agricultural activities, disposal of household or settlement finds through the dispersal of middens, or finds of archaeological material from a ploughed out settlement. The field has apparently not seen early medieval settlement, as it has virtually no personal items to accompany the ironworking finds.

It is possible to account for some of the material by postulating that the area has been used for disposal of construction timber which might account for the nails in the assemblage. The tools and evidence of blacksmithing are more difficult to account for.

Some metalworking material and waste may turn out to have a later date. There is some doubt over the antiquities of some billets. Paul Sherman (pers. comm.) notes that the form of some thick neatly shaped billets is more like steam-pressed than hand-wrought iron billets in a pre-industrial setting. The heat required to work these makes it an inefficient way for pre-industrial smiths to process their metal.

However, this still leaves a number of finds which are of general medieval date and a few more closely dated to the early period. Some finds could be interpreted as a battle assemblage but the lack of spears, swords and scarcity of arrowheads means this is not conclusive. As such it is possible that the material is associated with the battle of Brunanburh but further diagnostic material is required in order to confirm the attribution.

Locating the Battle

The recognition that there are various stages to a battle poses the question as to how the finds assemblage recovered so far relates to the progress of the battle, from the initial camps, through the day of engagement, to the aftermath. In theory it should be possible to reconstruct the various stages of the battle through the distribution of finds across the landscape.

Standard survey practice in archaeological investigations of battlefields from the Roman period battlefields relies on a systematic metal-detector survey to recover artefacts associated with the battle. Archaeological surveys using metal-detectors or fieldwalking to collect surface finds from plough or other topsoil are undertaken systematically using gridded or transect methods to recover a sample of finds from the area of survey. The ground is covered evenly to ensure that recovery of finds is subject to the same intensity of coverage. This sampling strategy produces an overall distribution of finds across the survey area within which variations in the density of finds can be assessed and concentrations or gaps can be identified. There is a consistent emphasis on the need to locate all finds, in two- or three-dimensional plotting by GPS. The systematic recovery needs to be followed by specialist identification of the finds to ensure that the inevitable mass of post-medieval material present in almost all fields (cf Philpott 2018) is screened out and reliable identifications are used to form distribution patterns.

This enables concentrations of particular types of find to be identified, with the possibility, especially in a battlefield setting, to identify finds distributions which might help reconstruct the disposition of forces, progress of the battle and the movement of forces across the field. Such was the result of detailed systematic metal detector survey at Edgehill (Historic England 2017, 11-12, fig. 10) where although later in date the same principle of logging and recording findspots of different kinds of object or projectile applies, and enables aspects of the battle strategy as well as its precise location to be identified.

Finds Distributions

As part of the process of identifying and cataloguing the finds, the newly created database has incorporated all finds information recorded by WA. In theory, the database should enable various types of find to be plotted on a base map using the GIS program ArcGIS. Finds can be plotted by any criterion, or combination of criteria, which are recorded as distinct fields in the database. In practice, the most useful for the current project are the location of finds by type and by date. This should enable the location of all early medieval finds or all weaponry, for example, to be plotted.

However, the Wirral Archaeology finds assemblage suffers from one fundamental problem, an almost total lack of findspot information for the most important diagnostic early medieval finds. This is a serious obstacle to identifying spatial patterns and identifying the location of early medieval activity that might be associated with the battlefield.

There is a thin concentration of arrowheads and gaming pieces within the field designated by WA as [locational data removed]
(see major concentration in Fig. 3), although these only represent a small proportion of the potential findspots. This with other concentrations of iron tools and other items from metalworking and other crafts, including other metalworking waste, is consistent with Wirral Archaeology's suggestion that this was the location of a camp associated with the battle. However, very little of the material is datable so some caution is required in associating the finds with a known historical event.

As regards the battlefield itself it is difficult to discern from the finds distribution where the fighting took place. The lack of information on important finds, coupled with an inability to plot the areas that have been detected and those where no detecting had taken place, so identifying gaps in the distribution means that the distribution plots are of limited value.

The results of the sample distribution plots are shown in Figures 3-6.

Fig. 3: Plot of all catalogued WA finds (all types, materials and dates); OS Opendata Street View base map

[locational data removed]

Fig. 4: Distribution plot of WA finds, generated from new Access database and filtered for copper-alloy and lead objects of all dates (base map is OS 1st edn, which shows former field boundaries)

[locational data removed]

Fig. 5: Distribution plot of WA finds (copper-alloy only), all periods

[locational data removed]

Fig. 6: Distribution plot of gaming pieces (in red) and arrowheads (blue) [NB: find 36 plotted on incorrectly recorded coordinates] also this plot includes some finds subsequently dismissed as arrowheads.

[locational data removed]

SECTION H: Recommendations for the future – Paul Sherman, Rob Philpott, Clare Downham

This feasibility student has demonstrated that the corpus of pre-modern material is a small portion of the overall number of WA finds. The review has highlighted that we cannot be reliant on find identifications provided by Wirral Archaeology volunteers in order to identify which items are of archaeological significance, and a full catalogue has not been provided. Without fuller information on the full corpus of material, a cost evaluation for cleaning, stabilisation, conservation, identification and future storage is not possible.

Priorities for the Battle of Brunanburh project henceforth

1. There should be provision for the full recording and cataloguing of the many additional finds (c. 2000) which WA holds, which were not seen or were not recorded in detail as part of this report. To catalogue all the finds will be a major undertaking, requiring a considerable investment of specialist time. This could be reduced if the promised database were available. The cataloguing for the current report required all finds to be measured and weighed, and locational information added to the database, which slowed down the process of recording for this feasibility study. As part of this process incorrectly identified objects should be rebagged with correct identification labels to avoid future confusion.

2. It is further recommended that a single master database of the finds, with entries and identifications validated by appropriate finds specialist, with a single unique number allocated to each find should form the basis of all further documentation – photography, database entry, finds identifications and ultimately publication of the evidence. The database structure created for the current report is used as a basis for further logging of the finds.

3. As there are a number of finds of potential regional/national significance, it is recommended that there should be professional curatorial oversight of the finds and that these should be transferred to a suitable designated repository when they can be stored in environmental controlled conditions and any measures taken for their conservation. We recommend that all the finds currently identified as medieval or earlier should fall into this category. Conservation advice should be sought from suitably experienced and qualified conservators. Ironwork is particularly sensitive to deterioration in hostile conditions and will need careful treatment.

4. An overall project design is required for the management and direction of the Battle of Brunanburh project which should follow best practice for archaeological projects, following the guidance and standards of the Chartered Institute for Archaeologists. This is to ensure that the project aims are clear; the methods used to achieve those aims are agreed and adopted by all participants; high quality records are maintained as part of a project archive; and the finds are recorded, documented and stored appropriately. The results are published following standard archaeological practice, so that the evidence for the claims relating to the Battle of Brunanburh can be assessed independently.

5. A multidisciplinary team including WA should be brought together to ensure that specialists are closely supervising all activities in implementing the project aims. This could commence with a series of training exercises based around fields where key finds were recovered. This could comprise

a series of days of supervised metal-detecting with a specialist on hand to advise on methods, recovery of items and recording. This would provide training for WA in achieving the standards required as noted in 3. above. This would also ensure that an integrated approach is undertaken in achieving the project aims.

6. All fieldwork is undertaken to the highest professional standards, and each intervention including each day of metal detecting results in a written report and archive. This is to meet professional standards and it ensures that the results are accessible and available for scrutiny by other professionals.

7. The project design should have provision for the full recording and cataloguing of finds. Finds cataloguing should be undertaken by, or closely supervised by, specialists in the field in order to ensure that the finds from this important site are accurately identified. This will maximise the value and information recovery from the site, enabling sound conclusions to be reached about the significance of the finds for the progress of the project and location of the battle of Brunanburh.

8. Resources need to be allocated to the assemblage for X-raying ironwork, archaeometallurgy, specialist identification of finds, and conservation of the material, to professional standards. The resources required to implement the project design should be identified, along with sources of funding.

9. Detailed records are kept of all stages of the project as the information collected will form integral parts of the archive. The archive represents the primary data for the identification and reconstruction of the battlefield and associated battle activities.

10. The project design should include plans for the public dissemination of the results of the project, including full publication to professional standards.

11. The public interest in the Brunanburh project highlights the scope for further development of Wirral's Viking Age heritage as a tourism asset. There is, for example, scope to market the Wirral as part of a 'Viking coast' heritage route running from the Welsh border to Cumbria which could have commercial success akin to other long-distance coastal tourism routes including the 'Wild Atlantic Way' in Ireland and the 'Whithorn Way' in south-west Scotland. Even with current health concerns, such a route could be covered by car or bicycle in a socially distanced way, although some consideration would have to be given to provision of facilities (dining, accommodation etc.).

12. As the finds assemblage from the current project grows there would be scope for the designated repository to host 'Battle of Brunanburh' exhibitions, along with public lectures in partnership with the University of Liverpool. This has the potential to bring in visitors to the area to learn about Wirral's rich Viking heritage and generate tourism income.

SECTION I – The standards for listing a Registered Battlefield – Clare Downham

The Register of Historic Battlefields was established in 1995 and is administered by Historic England. The National Planning Policy Framework sets out that registered battlefields are designated heritage assets of the highest significance. The sites of 47 important battles are currently listed. Within the current listing, the Battles of Maldon (991) and Hastings (1066) are the earliest conflicts to have registered battlefield sites. Most of the listed battlefields are linked to the early modern period. The four registered battlefields in North West England are Nantwich (1644) Solway Moss (1542) Rowton (1645) and Winwick (1648). Designation of the Brunanburh site would make it the oldest listed battle-site in Britain, and the only medieval site in North West England.

The Historic England listing is distinct from The Battlefield Trust which is a registered charity dedicated to the protection, promotion and interpretation of Britain's battlefields. There are currently five battlefields on the trust's books in the North West Region, this comprises the four HE registered battlefields and Montgomery (Shropshire, 1644). A meeting with the Battlefields Trust was organised at Shrewsbury in February with regional chair James Parker but this was postponed due to flooding and then COVID19. Clare Downham since been in contact with the new regional chair Sophie Ambler and the University of Lancaster and Trust is keen to learn of ongoing work related to the Battle of Brunanburh.

According to Historic England guidelines published in December 2017: "If the site of a battle is to merit registration it has, notwithstanding any other claims, to have been an engagement of national historic significance, and to be capable of secure location on the ground." The principle criteria are as follows:

1. The battle must be of historic significance
2. The battle's location must be securely identified (primarily through secure evidence of where the conflict took place but camps can also be included in the designated area)

Additional criteria which will be considered are:

3. Topographic integrity. Integrity relates to the survival of the character of the landscape at the time of the battle.
4. Archaeological potential. This requires professional standards in the recording of finds.
5. Documentation, both historic and modern.
6. Evidence of military innovations that can add to the significance of the conflict.
7. Biographic associations, where the battle marks a significant point in the career of an important political figure.
8. Commemoration, so how a battle is remembered.

The evidence collected thus far for Brunanburh offers potential for a listing. The conflict has historic significance and parts of the local landscape being undeveloped/ lying within greenbelt offers topographic integrity. There is good documentation for the battle although there is not unanimous agreement within academia that Brunanburh took place near Bromborough. There are good biographic associations with the careers of Athelstan, Constantine and Olaf Guthfrithsson. The conflict is also commemorated in local folklore.

The key therefore to obtaining Historic England certification is archaeological discoveries. The main drawback with the finds recovered so far by WA is not the lack of material but rather the lack of proper location and context records and the inadequate standards of preservation and storage of finds. This compromises the value of the data to date and mean more work will need to be conducted before a case can be presented. A programme of works is therefore recommended in Section H on the finds which were not considered as part of this feasibility and also a programme of further work to collect new archaeological data to requisite standards.

Battlefields which fail to meet the criteria for Historic England listing can still secure appropriate protection through identification on Historic Environment Records, local lists, and in planning policies. This should also be considered as a preliminary state to seeking Historic England list status.

References

Historic England: Battlefields Registration Selection Guide (Historic England: December 2017) https://historicengland.org.uk/images-books/publications/dsg-battlefields/heag072-battlefields-rsg/

Appendix 1: WA Documentation [This section redacted]

APPENDIX 2 NRM Laboratory report for [location removed] soil sample

Map and locational data of sample site removed

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SOIL MINERAL NITROGEN

ANALYTICAL REPORT

Laboratory Reference

Report Number 14730

Date Received 14-JUL-2020
Date Reported 30-JUL-2020

Sample Matrix : SOIL

The sample submitted was of adequate size to complete all analysis requested.
The sample will be kept as the dry ground sample for at least 1 month.

ANALYTICAL RESULTS *on 'dry matter' basis.*

Laboratory Reference	Sample Reference	Dry Matter	Nitrate N (+)	Ammonium N (+)	Available N (+) 30cm profile *
		% w/w	mg/kg	mg/kg	kgN/ha
139471	SOIL SAMPLE SITE B1	87.2	34.74	0.46	132.0

* The amount of soil mineral nitrogen as kg/ha has been estimated assuming the standard depth of 30cm for soil nitrogen profiling. If the depth was not 30cm, this must be taken into account when calculating nitrogen recommendations.
+ If Stones content not stipulated on sample submission form then 0% Stones assumed. Otherwise correction applied.

Released by Myles Nicholson Date 30/07/20

NRM Coopers Bridge, Braziers Lane, Bracknell, Berkshire RG42 6NS
Tel: +44 (0) 1344 886338 Fax: +44 (0) 1344 890972 Email: enquiries@nrm.uk.com www.nrm.uk.com

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ANALYTICAL REPORT

Laboratory Reference

Report Number 14730

Date Received 14-JUL-2020
Date Reported 30-JUL-2020

Sample Matrix : SOIL

The sample submitted was of adequate size to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

ANALYTICAL RESULTS *on 'dry matter' basis.*

Laboratory Reference	Sample Reference	pH water [1:2.5]	Sand 2.00-0.063mm	Silt 0.063-0.002mm	Clay <0.002mm
			% w/w	% w/w	% w/w
139471	SOIL SAMPLE SITE B1	6.1	58	26	16

* The amount of soil mineral nitrogen as kg/ha has been estimated assuming the standard depth of 30cm for soil nitrogen profiling. If the depth was not 30cm, this must be taken into account when calculating nitrogen recommendations.
+ If Stones content not stipulated on sample submission form then 0% Stones assumed. Otherwise correction applied.

Released by *Myles Nicholson* Date *30/07/20*

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ANALYTICAL REPORT

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Sample Matrix : SOIL

The sample submitted was of adequate size to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

ANALYTICAL RESULTS *on 'dry matter' basis.*

Laboratory Reference	Sample Reference	Water Soluble Chloride mg/kg	Water Sol Sulphate 1:2 mg/l
139471	SOIL SAMPLE SITE B1	7	58.9

* The amount of soil mineral nitrogen as kg/ha has been estimated assuming the standard depth of 30cm for soil nitrogen profiling. If the depth was not 30cm, this must be taken into account when calculating nitrogen recommendations.

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APPENDIX 3 COIN FINDS

Coin finds are important at archaeological sites as they provide reliable dating evidence. Several coins have been recovered from the main finds site at [data removed for public version]. One of these coins (a silver penny of Edward I) was recorded at a Finds Day where Sherman and Downham were present (and thus remembered the find) but it was not included in the finds submitted by WA for review. Three coins have been recovered since the first draft of this report was completed. However, the coin finds are significant enough to be noted in this report and thus a brief appendix has been added. The three additional discoveries comprise an eighth century dirham identified by Jani Oravisjarvi, a Byzantine aspron trachy cup coin of possible thirteenth century date, provisionally identified by Peter Jenkins and a Charles I half groat. The presence of such dirhams could well be seen as a strong indicator of Viking Age trading in the area .

Abbasid dirham minted Madinat al-Salam (Baghdad) 159h (775/6AD). Photo: Peter Jenkins

Early 13th C Byzantine aspron trachy. Photo: Peter Jenkins